

## SOCIETY AFFAIRS

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## Items of Interest\*

## Co-Operation by Means of Joint Conference Committee of the Four Founder Societies

The Joint Committee on Co-Operation, which has been active in providing machinery for combined action of the National Engineering Societies, has fulfilled these duties and has been discharged by the Board of Direction.

The permanent organization, known as the "Joint Conference Committee of the Four Founder Societies", consists of the Presidents and Secretaries of these Societies.

For the coming year, the President and Secretary of the American Society of Civil Engineers are named as similar officials of the Committee. President Grunsky has appointed Past-President Loweth as his alternate.

Several matters of common interest were considered at its last meeting. The World Power Conference, of which preliminary information appears elsewhere in this number of *Proceedings*, was discussed.

\* Members are urged to contribute items of general interest.

The plans of the Italian Ambassador, Prince Caetani, to bring to this country recently graduated Italian engineers, was explained. Prince Caetani intends that these men shall begin work as laborers and obtain practical experience in the industrial plants and factories of America. This plan is only part of what is called an intellectual migration. It is his purpose to assist American citizens of art, culture, painting and music, to gain in Italy the experience which that country alone can afford. As authorized by the Committee, the Secretary has sent to the Italian Ambassador the following suggestion:

"The Joint Conference Committee is pleased to offer you its services in connection with receiving these young men upon their arrival in this country. If it meets with your approval it is thought that a reception in their honor might be held in Engineering Societies Building, with an address of welcome by a distinguished American engineer. In case this plan meets with your approval, the Committee wishes to invite your Excellency to be present and to participate in the program."

A specific instance of mutual help among the Societies was discussed, namely, the prospect of a definite policy whereby the various Local Sections of a community may act in conjunction or may affiliate with an independent local engineering organization.

### Status of Government Sanitary Engineers

For some time efforts have been exerted to secure legislation whereby engineers of the United States Public Health Service might be accorded commissioned rank.

Action on the matter was considered at the last session of Congress, but the proposed bill was not actively pushed. There is a prospect that during the present session, legislation of a nature to receive the approval of the Treasury Department and Public Health officials, as well as of the Engineering Profession, may be submitted for enactment.

When this matter was brought to the attention of the Board of Direction at the 1923 Annual Convention of the Society, in Chicago, Ill., the Board referred it to the Sanitary Engineering Division which, in turn, appointed as its Committee, Messrs. George W. Fuller, Chairman, Morris Knowles, George C. Whipple, and W. L. Stevenson, under whose guidance considerable headway has been made.

The Board of Direction at its meeting on January 15, 1924, adopted the resolutions presented by the Committee, which appear elsewhere in this number of *Proceedings*.

The Board of Direction at the same time designated the Committee of the Sanitary Engineering Division as a Special Committee of the Society.

### The Engineering Institute of Canada Holds Its Annual Meeting

The Annual Meeting of the Engineering Institute of Canada was held on January 23 and 24, 1924. The first day's session was devoted largely to business and social events. It also included a discussion of the fuel situation in Canada. On Thursday, January 24, engineering water problems received



a great deal of attention, especially the proposed St. Lawrence River waterway. Officers for 1924 were elected as follows: President, Walter J. Francis; Vice-Presidents, J. B. Challies, F. P. Shearwood, A. Surveyor, and F. A. Bowman; Treasurer, Major-General Sir Alexander Bertram; and Secretary, Fraser S. Keith. Messrs. Francis, Challies, and Shearwood are Members of the Society.

### Ambrose Swasey Awarded John Fritz Medal

The twentieth award of the John Fritz Medal was made January 18, 1924, to Ambrose Swasey, Hon. M. Am. Soc. C. E., of Cleveland, Ohio, for the building of great telescopes, benefactions to education, the establishing of Engineering Foundation, and the invention and manufacture of fine machine tools, precision instruments, and military and naval range finders.

This medal was established in 1902 in honor of the late John Fritz, Hon. M. Am. Soc. C. E., one of the great pioneers in the American iron and steel industry. It is awarded annually for notable scientific or industrial achievement and is the highest honor bestowed by the Engineering Profession in this country. Heretofore, it has been awarded to the following distinguished engineers: John Fritz, Lord Kelvin, George Westinghouse, Alexander Graham Bell, Thomas Alva Edison, Charles T. Porter, Alfred Noble, Sir William Henry White, Robert W. Hunt, John Edson Sweet, James Douglas, Elihu Thomson, Henry Marion Howe, J. Waldo Smith, George W. Goethals, Orville Wright, Sir Robert A. Hadfield, Charles Prosper Eugene Schneider, and Guglielmo Marconi.

Ambrose Swasey was born at Exeter, N. H., December 19, 1846, of New England lineage. He worked at the machinist's trade in Exeter and in the Pratt and Whitney Company's shops at Hartford, Conn. In these early years, he met Worcester R. Warner, who became his lifelong friend and partner in the firm of Warner and Swasey. About 1880, they went to Chicago, Ill., but soon concluded that Cleveland was the more suitable location for their business.

Among the remarkable telescopes built by his Company are the 36-in. Lick refractor at Mt. Hamilton, California; the 26-in. telescope of the Naval Observatory at Washington, D. C., the 40-in. telescope of the Yerkes Observatory at Williams Bay, Wis., and the 72-in. reflecting telescope of the Dominion Astronomical Observatory at Victoria, B. C., Canada.

Mr. Swasey was one of the organizing members of the American Society of Mechanical Engineers, of which he is also a Past-President and Honorary Member. He is an honorary member of several other engineering societies of America and Europe, Officer of the Legion of Honor of France, a member of the National Academy of Sciences and of the National Research Council, and a Fellow of the Royal Astronomical Society of England.

The most notable of his many public benefactions was the establishment in 1914 of Engineering Foundation.

Mr. Swasey was elected an Honorary Member of the Society on June 6, 1921.

### World Power Conference

The World Power Conference which will be held in London, England, June 30 to July 12, 1924, in connection with the British Empire Exhibition, will probably be attended by many members of American Engineering Societies.

The Society will be represented on the American Committee by Messrs. Peter Junkersfeld and George A. Orrok.

The Committee has chosen the new Cunard liner, *Scythia*, to carry the party. This steamer will sail from New York on June 19, and from Boston on June 20, and is due to arrive in Liverpool on June 28, thus allowing the party one day to get settled in London before the opening of the Conference on June 30.

The reservations on the *Scythia* are being handled by Messrs. Thomas Cook and Son which agency has secured accommodations at London hotels and is also arranging a series of tours in Europe, both technical and scenic, for travel both before and after the Conference.

A circular giving particulars will soon be sent to the members of the Founder Societies.

### Further Progress of Arch Dam Investigation

The work of the Committee on Arch Dam Investigation under Engineering Foundation has been noted previously in these pages; also the encouraging support of the Southern California Edison Company, both technical and financial. Harry H. Dennis, M. Am. Soc. C. E., representing W. A. Brackenridge, M. Am. Soc. C. E., Senior Vice-President of the Southern California Edison Company, has supplied details of the plan for utilizing the funds by constructing a full sized test dam.

Favorable conditions for building such a structure exist at a site on Stevenson Creek, a tributary to the San Joaquin River, California. The proposed site is in a narrow canyon, affording excellent foundations on solid granite with practically no earth covering. The canyon is extremely steep so that the experimental reservoir may be small—a desirable feature.

A water-supply tunnel of the Edison Company passes near this dam site and a connection to the tunnel just above the proposed dam will make possible the filling of the reservoir in a very short time. This will afford also perfect control of the water in the test reservoir without depending at all on the natural flow of the creek.

The construction railroad and roads of the Edison Company pass near this dam site and provide convenient transportation conditions. The test dam and reservoir will be located entirely on Government land. In case of a break of the dam during the tests, the small quantity of water in the reservoir will flow down Stevenson Creek and empty into the San Joaquin River. The capacity of the reservoir will be so small and the natural condition below the dam so favorable that no damage would result from the outflow of the water, should the test dam be broken.

It is proposed first to build the dam to a height of about 60 ft. and then test it repeatedly under various loads and temperature conditions for about

one year. After all the information obtainable from testing this 60-ft. dam has been obtained, it is proposed to increase the height of the structure successively in steps of about 10 ft., making such tests at each stage as may be desirable until eventually failure occurs.

### Engineering Foundation Participates in Society Activities

Engineering Foundation has granted financial assistance to Committees of the Society for the coming year in the following amounts: Committee on Concrete Arches, \$3 000; and Committee on Steel Columns, \$1 000.

In addition, the Foundation is spending almost \$3 000 on the work of its own Committee on Arch Dam Investigation, which subject is of vital interest to this Society.

The representatives of the Society on Engineering Foundation for 1924 have been elected, as follows, Messrs. Edward D. Adams and Robert Ridgway.

### Headquarters for Society Members Visiting London

Among the events of engineering importance to occur in London, England, in the summer of 1924 are the International Conference on Sanitary Engineering, June 3-6, and the World Power Conference in July, of which detailed information is given elsewhere in *Proceedings*. Members hoping to attend these meetings will be interested in the following letter:

"The Institution of Civil Engineers  
Great George Street, Westminster, S. W. 1  
December 21, 1923.

"THE SECRETARY,

THE AMERICAN SOCIETY OF CIVIL ENGINEERS

33 West 39th Street

New York, N. Y.

"MY DEAR SIR.—I am desired by the Council to ask you to convey to those of your members who may be in London next Summer in connection with the various functions that are then to take place, the very cordial invitation of this Institution to make use of its premises, and of any services which the Institution office may be able to render to them personally. It is intended to have a room set apart for our Engineering Visitors from Overseas in which they may be able to meet friends and conduct correspondence; and, further, if it will be a convenience to them, the Institution will be pleased for them to use this postal address and will arrange to forward letters to individual members to any temporary addresses they may advise from time to time during their stay on this side.

"Believe me to be, with kind regards,

"Yours very faithfully,

"H. H. JEFFCOTT

"Secretary."

### Congressional Hearing on Public Works Department

Two hearings were held in January before the Congressional Joint Committee on Government Re-Organization, at which engineers were afforded

opportunity to express views. This action is in line with the Conference of January 9, 1924, in Washington, D. C., as noted in the February *Proceedings*.

On January 18, the Congressional Committee listened to J. H. Finney, M. A. I. E. E., representing American Engineering Council, Philip W. Moore, M. A. I. M. M. E., Secretary L. W. Wallace, of American Engineering Council, and Leonard Metcalf, M. Am. Soc. C. E., representing the Society.

A second hearing on the same matter was held January 28, addressed by R. C. Marshall, M. Am. Soc. C. E., Mr. Finney, and Vice-President Lincoln Bush of the Society.

Mr. Marshall stressed the economies incident to re-organization, being questioned at length by the Committee. He presented the objection to continued present control of the U. S. Army Engineers as inefficient and contended that river and harbor work should be co-ordinated with other National and private projects. Mr. Marshall stated that he favored a large Army and an important Engineers Corps, the officers of which could be trained in the Department of Public Works more widely than at present, and more usefully for the many exigencies of war. He advocated control of such a department by civilians as not subject to the frequent changes of Army service.

Mr. Finney expressed his surprise and regret that some officials of the Government after endorsing the Brown Plan in substance (which engineers had therefore supported) have since changed their attitude. He preferred the inclusion in the proposed departments of only such bureaus as would fit with perfect accord.

Representing the Society, Mr. Bush drew from his own experience in presenting reasons for placing civil engineering functions of the War Department in the new Public Works Department. He emphasized the fact that during the World War most of the work had to be turned over to civilians to relieve Army engineers for strictly military duties. Engineers, he said, desired to be of the utmost possible service in securing proper co-ordination of public works functions.

It is understood that at the conclusion of the hearing, when the bill is drawn embodying the Committee's conclusions, further opportunity will be afforded engineers to be heard regarding the specific plan.

### **Federated American Engineering Societies Becomes American Engineering Council**

The Federated American Engineering Societies at its Annual Meeting in January, 1924, changed the name of the organization to "American Engineering Council," subject to the approval of the new Constitution by the affiliated organizations. Under the new plan, the former Council becomes the Assembly and the Executive Board becomes the Administrative Board.

James Hartness, former Governor of Vermont, Past-President of the American Society of Mechanical Engineers, and a well-known manufacturer, becomes President of the American Engineering Council, vice M. E. Cooley, M. Am. Soc. C. E., resigned.



### How to Survey Two Hundred Miles of River in One Month for One Thousand Dollars

An interesting incident was related at the recent dinner of Past and Present Officers of the Society, held just previous to the Annual Meeting, by Desmond FitzGerald, Hon. M. Am. Soc. C. E. It bears repeating for the benefit of members. Mr. FitzGerald told how he had an opportunity in his younger days of submitting a plan, in competition with other engineers, for making a survey of Osage River, Missouri, under the supervision of Government engineers, the conditions being that the field work would cost not to exceed \$1 000.

Mr. FitzGerald's plan, which was accepted and carried out, was as follows: He was to leave St. Louis, Mo., with one competent assistant and a few simple instruments such as a prismatic compass and a steel tape. The whole survey was to be completed in one month. The head-waters were traversed in a skiff purchased for \$25, notes being taken along the way. When the party arrived at deep water, a flat barge was constructed for the accommodation of the party which was enlarged by the addition of a hunter who was thoroughly familiar with the river. The skiff was then firmly attached to the front of the larger boat and a strong rower assigned to the skiff; Mr. FitzGerald sat at the front of the flat boat, taking compass readings and keeping notes. For each course a bearing was read and an estimate of the distance made by each of the three men independently, the average being taken as the assumed length. After floating down ten miles of river, the craft was moored and, while the others made preparations for camping over night, Mr. FitzGerald would hunt out the nearest farm and determine the location of the end of the day's work with reference to the nearest Government section corner. Thus, the day's survey could be adjusted later to agree with this location.

So successful was this scheme that the work was completed within the time and price of the estimate. As a result of the work, Mr. FitzGerald received the additional commission of making the resultant map and report, which were sent to Congress. Incidentally, the success of the plan led to other engagements.

### "Chartered Civil Engineer"—a New British Designation

For several years, The British Institution of Civil Engineers has studied the question of a proper title for recognized civil engineers. This matter has been taken up with His Majesty's Privy Council, and has been settled to the satisfaction of both the Council and the Institute. Secretary H. H. Jeffcott of the Institution describes the status of the matter in a letter to its members, a part of which is as follows:

"After very earnest consideration of the position, and of the views of others claiming to be concerned with the issues involved, the Council [of the Institute] were satisfied that The Institution could not with any confidence anticipate a successful outcome of an attempt at that time to secure, by means of a Registration Act, legal limitation of the assumption of the title 'Civil Engineer' to those appropriately qualified in the particular species of knowledge which,

according to The Institution's original Charter, constitutes the Civil Engineer's profession.

"The Council accordingly turned their attention to the question of the best means of obtaining authoritative recognition of the fact that Corporate Members of The Institution are Chartered Civil Engineers—just as, for example, certain Accountants are Chartered Accountants—and of definitely confining to its members alone the right to use that designation. This object has been attained by the Supplemental Charter of the 24th February, 1922, and the By-Laws approved by the Privy Council in accordance therewith.

"The benefit which members of The Institution may derive from this step is a matter largely in their own hands; for public acceptance and appreciation of the value of the designation 'Chartered Civil Engineer' must obviously be in proportion to the unanimity and uniformity of the practice of the members in regard to its use. \* \* \* This, however [use of the title in letter-heads, etc.], is a secondary matter in comparison with the advantage likely to accrue from the systematic use by members of 'Chartered Civil Engineer' to describe their profession, *e. g.*, in proofs of evidence, etc., and on similar occasions calling for a statement as to occupation, where the term 'Civil Engineer' is now employed.

"It is an important consideration in this connection, that the professional description now authorized, which connotes definite qualifications of a high order, should not be subject, in the public mind, to the uncertainty of status which has tended to attach itself to a mere designation of membership of a Society, or to the confusion which results from the unregulated employment of the term 'Civil Engineer'.

"The Council therefore wish to urge strongly upon every Member and Associate Member of The Institution the desirability of his using, on all such occasions as those referred to, the professional description 'Chartered Civil Engineer'."

### Dinner Conference on Engineering Education

The response to invitations for the Dinner Conference on Engineering Education held on Thursday evening, January 18, 1924, just prior to the Annual Smoker of the Society was especially gratifying. The purpose of the meeting was to present the plan for the investigation now being conducted by the Society for the Promotion of Engineering Education in conjunction with the National Founder Societies under the generous financial support of the Carnegie Foundation.

Although the time was limited, the two hours devoted to this meeting were crowded with pleasant and profitable discussion. About 115 members and guests attended the dinner, following which D. C. Jackson, M. Am. Soc. C. E., Professor of Electrical Engineering, Massachusetts Institute of Technology, acting as Toast Master, introduced several engineers who spoke on the problem of Engineering Education. Charles F. Scott, Professor of Electrical Engineering, Yale University, described the origin and development of present efforts to study engineering education. Following Professor Scott, an address was delivered by W. E. Wickenden, Director of the Board charged with conducting the study. Professor Jackson then called for brief talks from A. N. Talbot, Past-President, Am. Soc. C. E., F. C. Shenehon, M. Am. Soc. C. E., serving as representative of the Society on the Committee in charge of

the projected investigation, J. L. Harrington, M. Am. Soc. C. E., and C. H. Mitchell, M. Am. Soc. C. E., Dean of Engineering, University of Toronto.

The general interest displayed indicates the great possibility of the program for studying engineering education. The teachers and the practicing engineers were about evenly represented at this meeting and were a unit in their favorable comments on the aims and prospects of the work.

For the benefit of those who may be interested in this work, excerpts from the remarks of Mr. Wickenden are given, as follows:

"There is a general agreement that the content and methods of engineering education in the colleges should be better adapted to present-day needs and the newer ideals of the Engineering Profession.

"This is the one thing about engineering education on which every one is agreed. Engineering education has been good, it has been sound, and its products do it credit, but engineering is a growing and developing thing; it is coming up to the new levels of human service. If the profession is to realize these ideals and aspirations, the education of the engineer must be better, broader, sounder, and more socialized. The profession at large will not in great measure realize its ideals unless they are anticipated in the processes of professional training. It will not be enough to have them merely reflected in such training. Our educational troubles arise in no small measure from the fact that the curricula and processes of the engineering schools are products of evolution, rather than design. Evolution is a tardy process of adaptation and the tendency is for engineering education to be perpetually out of date.

"As the present methods of engineering training are in the nature of a compromise between general training and professional training, the complaints and recommendations that come from different sources are very contradictory. The courses are said by some to be too long and too elaborate and by others to be too short and too elementary; both are right. The general dearth in this country of specialized technical schools intermediate in rank between the high school and the colleges doubtless thrusts on the engineering colleges many men for whom a less elaborate, briefer and more definitely specialized training would be far preferable. On the other hand four years is probably too short a time in which to lay foundations having both breadth and depth.

"Engineering students are said to be too heterogeneous for good teaching. Men who need to attain a thorough mastery of basic subjects are mixed in with others who can do well enough with only a bowing acquaintance with the same subject-matter. The devotees of job analysis and project training find the courses too diffuse, while business executives in search of highly adaptable men find them too specific. Some favor the part-time co-operative plan because of the early and intimate contact with the atmosphere and problems of industry, others hold that the best training for critical and creative thinking cannot be given by any process involving frequent interruptions. Both may be right, depending on the type of student.

"Engineering courses abound in stereotyped project and exercise work which affords excellent discipline for the mediocre and little autonomy for the development of the powers of imagination and invention. There is probably too much driving by instructors and not enough self-direction by students, with the result that graduates are too often paragons of diligence when closely supervised, but poorly equipped for further self-education.

"It is felt by many that there is too much preoccupation in engineering colleges with the purely physical ways and means of engineering and too little concern with methods of economic selection between alternative courses of action. There is universal complaint, in which the graduates have a large share, about the faulty English of young engineers and their general deficiency in powers of self-expression. It seems fairly evident that young engineers lack

skill in selling their services, lack insight into human nature and are poorly equipped to predict and influence the course of human behavior, all of which are qualities vital to business and public leadership.

"It is being widely questioned whether four-year undergraduate courses in engineering can be properly regarded as professional training. It is quite generally conceded that no four-year undergraduate course can possibly produce a professional product comparable to that of the best schools of law, medicine, dentistry, and divinity. There is an increasing tendency to regard the undergraduate engineering course as an excellent type of general college training, more concrete in its methods and more specifically related to current problems in applied science and economics than the traditional arts course, and, therefore, better adapted to certain types of minds, but not an adequate preparation for professional practice. If such a view is to prevail, it leaves the entire problem of bringing engineering education up to an adequate professional plane still on our hands with many unsolved questions as to how colleges and the professions, together with the forces of industry and public administration, may best work together in achieving such an end."

### Architects for Federal Re-organization

The interest of the American Institute of Architects in the proposed Government engineering changes, involving remodeling of the Department of the Interior, resulted in that organization's active participation in the Conference on Public Works, held in Washington, D. C., January 9, 1924.

The Institute supports the so-called "Brown Plan" *in toto* with especial emphasis on the phases that recognize the importance of architects in the Government organization, particularly the office of Supervising Architect which it is proposed to transfer to the projected Division of Public Works in the Interior Department.

"The Government," states a report of the Institute's Committee on Public Works, "engages in construction work of all kinds, from that which may be regarded as purely engineering work, such as land reclamation work or river and harbor work, to that which is considered purely architectural, such as public buildings and monuments.

"No sharp line can be drawn dividing architectural from engineering work. The technical knowledge of the engineer is necessary to the architect in practically every problem involving construction, and the artistic skill of the architect is of value to the engineer in the great majority of the construction problems with which he has to deal.

"Better understanding, greater appreciation, closer co-operation between the two professions are more and more in evidence year by year. If all the construction activities of the Government were brought together into one department or bureau, the co-ordination of the work of architect and engineer, would inevitably produce better results and redound to the advantage of the country at large."

### Conference of Local Sections

One of the important gatherings at the time of the Annual Meeting was the Conference of Representatives of Local Sections held January 17, 1924, and attended by about 50 members and guests, representing 31 out of the 42 Sections.

The meeting took action toward definite organization by adopting Rules of Order for recommendation to the Board of Direction. The following matters



also were discussed: Future meetings of Local Section representatives; payment of mileage to delegates at such meetings; procedure of similar bodies in other National Societies; resolutions on the death of George G. Anderson, a Director of the Society; and the licensing of engineers.

### "Preferred Numbers"—a New System for Designation of Sizes

Wherever articles are used in a variety of sizes—graded according to the demands of utility—it is essential, first, to determine the proper comparison of adjacent members in the scale and, second, to designate these graduations of size by some reasonable method as, for instance, by arbitrary numbers (gauge numbers). The use of "preferred numbers" attempts to fulfill both these requirements. The subject was discussed at length at the 1923 Annual Meeting of the American Society of Mechanical Engineers, by Messrs. C. F. Hirshfield and C. H. Berry.

The "number" may refer to a dimension, a capacity, a weight, or any other quality; it is "preferred" when widely adopted by manufacturers and users as representative of the characteristics implied. In France and Germany, where a similar system is in use, the terminology describes them as "numbers for standardization".

In any case where the varieties within a series can advantageously follow some exponential law, the system of preferred numbers has its greatest value. For instance, the long dimensions of 2-in. lumber varies by inches up to 2 by 8 in. and then by 2-in. increments up to 2 by 16 in. The strength in bending varies as the square of the depth; thus, a 2 by 4-in. piece is 78% stronger than a 2 by 3-in. piece, whereas the strength of a 2 by 8-in. piece is only 30% more than a 2 by 7-in. piece. Clearly, the choice of timber for strength in the larger sizes involves less possible waste than for the small sizes.

The preferred number classification would avoid this by making the ratio of increase uniform. For example, if it were desired to standardize sizes of large pipes according to this plan, the series might be

10 16 25 40 64 100  
in which each size is 60% larger in diameter than the preceding; or if closer spacing of sizes is needed, insert the geometric mean between each two terms, thus:

10 12.5 16 20 25 32 40 50 64 80 100  
wherein each size is 25% larger in diameter than the preceding. In all such cases, the cross-sectional area of the pipe, thickness of wall, weight per unit length, and other factors of calculation, also, fall into a geometric series. In several instances, as the size of incandescent lamps and the Brown and Sharpe wire gauge, the variations have followed the desired system, perhaps inadvertently, but, nevertheless, to the satisfaction of all users. The application to civil engineering work might include the sizes of rolled sections, including rails and reinforcing steel, the dimensions of equipment, as track gauges and tie-spacing, the capacity of machines, as shovels and concrete mixers, the scales of maps, the intensities of floor loading, and the sizes of sand sieves.

In practice, after deciding the limits of a series and the total number of sizes, the various members are known as to dimension. Conversely, if one member is known, any other member can be found. The reasonableness of some such scheme must commend it to engineers. The American Engineering Standards Committee has collected during the past two years considerable data on the development of this subject in Europe and has organized a committee to study its applications to American problems. The Society has become identified with the study of the whole question by virtue of the recent appointment of Frederick T. Llewellyn, M. Am. Soc. C. E., as its representative on the Committee. The Committee is desirous of obtaining views and suggestions from any members interested, which communications may be addressed to the Chairman, Committee on Preferred Numbers, American Engineering Standards Committee, 29 West 39th Street, New York, N. Y.

### **Joint Japanese-American Company Formed for Reconstruction of Tokyo**

A building construction company has been projected in Tokyo for the purpose of undertaking "to do civil engineering construction work and to give loans to building contractors for construction expenses and also to import materials from foreign countries to supply the demand", according to a tentative prospectus received by the U. S. Department of Commerce.

This new company is said to include that previously projected and sponsored by the Tokyo Chamber of Commerce, which was to specialize in the construction of industrial and commercial buildings on the unit basis designed to withstand earthquake shocks.

The new corporation will be known as the "Nichi-Bei Doboku Kabushiki Kaisha", or "Japanese-American Engineers' and Contractors' Corporation", and will be financed and controlled jointly by Americans and Japanese. Head offices will be established in Tokyo, with branches in other parts of Japan as may be deemed necessary. The corporation is to be capitalized at 100 000 000 yen (\$50 000 000). The shares will be divided equally between Japanese and American citizens, it is said, insuring joint control of the venture.

This project differs from the previous one, in that it proposes not only to participate in the work of reconstruction throughout the devastated area, but to undertake to carry out building projects in other parts of Japan and the Far East and to engage in the importing business. According to the prospectus, the life of the corporation shall be twenty years from the date of establishment, but this period can be lengthened or shortened. Technical skill, machinery, and building materials needed in carrying out the plans of the corporation are to be secured in the United States according to present plans.

### **New Officials of United Engineering Society**

United Engineering Society, which is an organization for handling business details of common interest to the four Founder Societies, as, for example, the Engineering Societies Building and the United Engineering Societies

Library, has elected officers for the ensuing year as follows: President, W. L. Saunders, M. Am. Soc. C. E.; First Vice-President, George H. Pegram, Past-President, Am. Soc. C. E.; Second Vice-President, J. E. W. Reynders; Secretary, Alfred D. Flinn, M. Am. Soc. C. E.; Treasurer, Joseph Struthers; and Assistant Treasurer, Henry A. Lardner.

The present representatives of the Society are Messrs. William J. Wilgus, George H. Pegram, and Lewis D. Rights.

### Publicity for Student Chapters

Further assistance of the work among Student Chapters of the Society is forecasted in the following letter from Secretary Dunlap recently sent to Faculty Counselors, Presidents, and Secretaries of Student Chapters:

"The Standing Committee on Technical Activities and Publications has authorized a new department in *Proceedings* on Activities of Student Chapters.

"In order to provide material for this department, you are invited to send this office copies of the minutes of each meeting, and descriptions from time to time of special activities. Due to the present high cost of printing, abstracts will be made of the material received with a view to publishing only that which is considered to be of general interest."

### Early Bessemer Rails Under Suspicion

It is difficult to believe, to-day, that steel rails of early manufacture were considered dangerous and unreliable. An interesting item from the early accounts of the Society (Minutes of the meeting of January 15, 1868), states that:

"A coil of steel wire made from one of the first steel rails (Bessemer process) rolled in this country, was presented through the President, from W. W. Evans, Esq., who, in his letter, states, 'I will be much pleased if the Society would appoint a committee, who will, when we get to rolling steel rails again, visit our works, for the purpose of seeing our steel rails rolled and tested by heavy hammers falling 20 ft., so that they may report on the quality of American Steel Rails, as there is great doubt expressed by most of the Railway Companies as to the capacity of Americans to make steel rails, and their quality after being made'."

### Duluth Section Active

That the Sections of the Society are becoming potent local forces, is evident from many sources. The following account of a recent meeting of the Duluth Section was taken from a staff article in the *Duluth News Tribune* of January 22, 1924:

"There are a lot of brains to be found outside of the movie business, if one looks in the right place. For pure, unadulterated gray matter parked in well developed cerebral cavities, specialized brains which plan and carry out projects of real magnitude, which build our railroads, highways, skyscrapers, public utilities and other modern things which go to make the United States the most progressive country in the world, one has but to attend a meeting of the Duluth Section of the American Society of Civil Engineers. The

Duluth Section has 40 members, and if you are present at a regularly scheduled monthly meeting, you will find them all there.

"The requirements for membership and the standard of ethics are high. One must not only be a skilled engineer, but must also have a background of experience and accomplishment. To become a member of the local section one must first become a member of the American Society and must furnish satisfactory references. All of which go to account for the brains found in the organization.

"It is plain to be seen that the members are intensely interested in the welfare of their Society."

### Present Form of Student Chapters Upheld

The report of the Society Committee on Student Chapters is marked by a complete discussion of the proposed movement toward a co-operative organization among various Student Chapters of National Societies in any college. The Committee finds that there is some demand for such a plan in the smaller schools, but the larger institutions ordinarily have, in addition to separate Student Chapters, a central Engineering Student organization. The recommendations adopted by the Board are "that the American Society of Civil Engineers continue to develop its present separate Student Chapter system, encouraging co-operation between its own Student Chapters and those of other National Engineering Societies, but rejecting the suggestion of joint chapters"; and, "a policy of active development and encouragement of our Student Chapters, with the object of increasing constantly their value to their members, to the Society, to the Institution at which they are located, and to the Profession at large."

### Society Committee on Cement Authorized

One of the important measures adopted by the Board of Direction on January 15, 1924, was the authorization of the President to appoint a Committee on Cement. In recommending this course, the Society Committee on Research outlined: (a) the vital need and desirable scope for such a study related to the material itself rather than its combinations; (b) its importance to a variety of classes, as manufacturer, engineer, and builder; and (c) the advisability of the utmost co-operation in the study, between laboratory, commercial, and chemical interests, even to the extent of including non-members of the Society on the Committee.



## Activities of Local Sections\*

### Annual Meeting of the San Francisco Section

The Annual Meeting of the San Francisco Section was held on December 18, 1923, at the Engineers' Club; President G. A. Elliott in the chair; and Henry D. Dewell, Secretary.

The following officers were elected for the ensuing year: President, Frank G. White; and Vice-President, B. A. Etcheverry. The Board of Directors of the Section consists of the following: President Frank G. White; Vice-Presidents H. C. Vensano and B. A. Etcheverry; Past-President G. A. Elliott; and Secretary Henry D. Dewell.

Papers on "The Design and Construction of the California Memorial Stadium", were presented by Messrs. Thomas F. Chace and D. W. Ormsbee. The reading of the papers was preceded by motion pictures representing the manufacture of cast-iron pipe by the latest methods.

### Joint Meeting of the Colorado Section with the Student Chapter of the University of Colorado

A regular meeting of the Colorado Section, which was also a joint meeting with the Student Chapter of the University of Colorado, was held at Boulder, Colo., on December 8, 1923; President John S. Means in the chair; William B. Freeman, Secretary; and present, also, 24 members and 12 guests of the Section and 38 members of the Student Chapter.

The meeting was preceded by a dinner at the Boulderado Hotel, at which about 60 were present and at which Professor W. C. Huntington presided as Toastmaster.

The regular business meeting was dispensed with and, at the conclusion of the dinner, Professor Huntington introduced President Means of the Section and President John Howard of the Student Chapter, and these gentlemen in turn introduced the members of the Section and of the Student Chapter individually.

Professor H. J. Gilkey, who was in charge of the Technical Program of the meeting, outlined the compression tests on concrete specimens, that were to be made at the Engineering Laboratory of the University.

The meeting then adjourned to the Engineering Laboratory and after an inspection of the concrete cylinders, the testing of specimens in one of the big testing machines was started about 8:00 P. M. These specimens made with different water ratios, different proportions of organic impurities, and with various gradings of aggregates, were from 31 to 49 days old. Before the specimen was broken, every one present was given an opportunity to make guesses as to its total ultimate strength, the guesses being recorded on a blackboard.

At the conclusion of the tests, a motion picture was exhibited, showing the methods of manufacturing and handling Portland cement at all stages, from the quarries to the consumer.

\* For list of Local Sections, Officers, Rules, etc., see 1923 Year Book, p. 15 and p. 297.

The Entertainment Committee in charge of this meeting for the Section consisted of Professors Huntington, Marcellus, and Dungan, and Mr. G. W. Hoffman was Chairman of the Entertainment Committee of the Student Chapter.

### Meeting of the Atlanta Section

A regular meeting of the Atlanta Section was held at the Ansley Hotel, Atlanta, Ga., on January 8, 1924; President J. H. Johnston in the chair; Frederick H. McDonald, Secretary; and present, also, 18 members and guests.

The following Committees for 1924 were appointed: Program, W. C. Spiker, Chairman; Civic Affairs, P. H. Norcross, Chairman; Publicity, W. R. Neel, Chairman; Revision of Charter, P. H. Norcross, Chairman; Affiliated Technical Societies, F. H. McDonald, Chairman; Membership, C. M. Wood, Chairman; Engineers' License Law, Arthur Pew, Chairman; Student Chapter, B. M. Hall, Jr.; and Local Committee on Spring Meeting of the Society, P. H. Norcross, Chairman.

The question of enlarging the activities of the Section to include out-of-town members, was discussed, and it was decided by unanimous vote to extend the activities of the Section to include all members of the Society resident in Georgia.

On motion, duly seconded, the President and Secretary were also instructed to request the Board of Direction for permission to change the name of the Section to the "Georgia Section".\*

During the discussion, it was brought out that the Section had been in existence since 1912 and that the membership had grown from 2 or 3 to its present active membership of 30.

The plans of the Section for 1924 were announced to include active co-operation with the Student Chapter at Georgia School of Technology; preparation for the Spring Meeting of the Society to be held during the week of April 7, 1924; and the enlargement of the scope of the Section's activities.

### Meeting of the Buffalo Section

A regular meeting of the Buffalo Section was held at the Hotel Statler, Buffalo, N. Y., on January 8, 1924; President George H. Norton in the chair; S. J. Stone, Secretary; and present, also, 32 members and 3 guests.

On motion, duly seconded, Mr. John H. Feigel was chosen to represent the Section at the Annual Meeting of the Society in New York, N. Y., January 16-18, 1924.

The speaker of the evening, Mr. F. R. Gasche, Chief Engineer of the Donner Steel Company, addressed the meeting on "The Engineer and Steel Production". In the course of his address, Mr. Gasche reviewed the important work done by the engineer in creating the plant equipment capable of producing the present enormous steel output. He also recalled how the engineer had consistently advocated the use of practical and feasible furnace and mill technique and had saved unwarranted expense by opposing untested and impractical fads in steel-making.

\* Change of name approved by the Executive Committee at its meeting of February 11, 1924.

### Meeting of the Central Ohio Section

A regular meeting of the Central Ohio Section was held at Columbus, Ohio, on November 30, 1923; President G. F. Schlesinger in the chair; Allan B. Tallmadge, Secretary; and present, also, 17 members and 5 members of the Student Chapter of the Ohio State University.

As delegate from the Section, Mr. F. W. Jennings presented a report on the Fall Meeting of the Society held in Richmond, Va., October 17-20, 1923, in which he reviewed the discussion on the functions of Local Sections presented at the meeting and described the inspection trips to the various points of interest.

Director R. N. Begien, of District No. 9, discussed the subject, "The Opportunities for College Graduates in Railroad Work", stating, in substance, that the decrease in the employment of college graduates by railroad companies has been a puzzling phenomenon for the past twenty years, and citing as possible causes slow promotion, low pay, keen competition for higher places, and lack of permanent residence. He stated that the first three objections are justified to some extent in the Maintenance, Construction, and Motive Power Departments, where nearly all the technical graduates employed by the railroad companies are to be found, which results in keen competition among highly trained men for a few positions. As transportation is the business of the railroads, Director Begien stated that the Transportation Department offers greater opportunity to the technical graduates than the other Departments and that the services of the trained technical man in the Transportation Department are becoming more and more necessary. A general discussion of the subject followed the address.

It was moved, seconded, and carried, that it was the sense of the meeting that all applications for membership in the Society in this vicinity be referred to the Eligibility Committee of the Section for action and recommendation.

It was also decided, on motion, duly seconded, that it was the sense of the meeting that each Local Section of the Society be represented at the Conference of Local Sections to be held in New York, N. Y., at the time of the Annual Meeting, in order to express the attitude of the Sections relative to matters pertaining to them, and that each Section meet the expenses of its delegate.

On motion, duly seconded, Mr. Jennings was requested to prepare a written report on the Fall Meeting of the Society at Richmond, Va., for distribution to all members of the Section.

It was also moved, seconded, and carried, that an Eligibility Committee of the Section be elected and that the President and Secretary be made *ex-officio* members of the Committee.

On motion, duly seconded, the Secretary was instructed to send a letter to the Congressmen of this District, expressing the disapproval of the Section of the removal of A. P. Davis, Past-President, Am. Soc. C. E., as Director of the U. S. Reclamation Service.

The following officers were elected for 1924: President, W. H. Dittoe; Vice-Presidents, T. S. Johnson and C. A. Raymond; and Secretary-Treasurer, J. R. Shank.

President W. H. Dittoe then took the chair and appointed Messrs. Schlesinger, Eno, and Jennings, as a Nominating Committee for 1924.

### Meetings of the Cleveland Section

A regular meeting of the Cleveland Section was held at the Hotel Winton, Cleveland, Ohio, on November 14, 1923; Vice-President D. W. Morrow in the chair; George H. Tinker, Secretary; and present, also, 10 members.

On motion, duly seconded, a resolution concurring in the protest of the Board of Direction of the Society against the action of the Secretary of the Interior in removing A. P. Davis, Past-President, Am. Soc. C. E., as Director of the U. S. Reclamation Service for the reasons set forth in the letter of the Board to Secretary Work, dated October 17, 1923, was adopted by the meeting. Secretary Tinker also was directed to notify the Senators and Representatives in Congress from this district to this effect and to attach to such notification a copy of the letter of the Board previously mentioned.

On motion, duly seconded, it was resolved that the Section contribute \$50 to the Alfred Noble Memorial Fund.

### MEETING OF DECEMBER 13, 1923

A regular meeting of the Cleveland Section was held at the Hotel Winton, on December 13, 1923; President W. E. Pease in the chair; George H. Tinker, Secretary; and present, also, 13 members.

On motion, duly seconded, Secretary Tinker was appointed to represent the Section at the Annual Meeting of the Society, his expenses to be defrayed by the Section.

President Pease appointed Messrs. K. H. Osborn, F. D. Richards, and J. H. Tufel as a Nominating Committee, which Committee reported the following names for officers for 1924: President, D. W. Morrow; Vice-President, J. E. A. Linders, and Secretary-Treasurer, George H. Tinker. On motion, duly seconded, these nominees were unanimously elected.

On motion, it was voted that the Executive Committee act as a Membership Committee.

### MEETING OF JANUARY 9, 1924

A regular meeting of the Cleveland Section was held at the Hotel Winton, on January 9, 1924; President D. W. Morrow in the chair; George H. Tinker, Secretary; and present, also, 15 members.

The minutes of the meeting of December 12, 1923, were read and approved.

The report of the Secretary-Treasurer for 1923 was read and, on motion, duly seconded, was accepted.

Secretary Tinker reported that he could not attend the Annual Meeting of the Society and on motion, duly seconded, Mr. Willard Beahan was appointed to represent the Section.



On motion, duly seconded, Mr. W. P. Rice was appointed as representative of the Section on the Cleveland Engineering Society Building Committee.

A communication from Secretary John H. Dunlap of the Society relative to the St. Lawrence Waterway was referred, on motion, duly seconded, to the Executive Committee with power.

### Meeting of the Dayton Section

The regular meeting of the Dayton Section was held on January 14, 1924, at the Engineers Club, Dayton, Ohio; President J. H. Kimball in the chair; and C. H. Eiffert, Secretary.

An address on "Technical Education, with Special Reference to the Antioch Plan", was presented by Philip C. Nash, Dean of Antioch College, at Yellow Springs, Ohio, which was followed by an interesting discussion of the subject.

It was also stated that letters had been sent by the Section to the Representatives and Senators in Congress from the District, urging the enactment of legislation for the appointment of a Commission to investigate the St. Lawrence River improvement.

### Meetings of the Duluth Section

A regular business meeting of the Duluth Section was held on October 15, 1923; President T. F. McGilvray in the chair; Walter G. Zimmermann, Secretary; and present, also, 18 members.

For the Committee on Papers, Chairman J. H. Darling presented a report on the subject of "Waste in the Building Industry", in which attention was called to the fact that the subject had already been carefully studied by the Federated American Engineering Societies. After discussion, on motion, duly seconded, the Committee was continued, with Messrs. Stack, Fixen and Kelly as added members, with a view to giving the subject further study and reporting at the next meeting.

Chairman O. H. Dickerson, for the Committee appointed to submit a report on a questionnaire sent out by the Chairman of the Standing Committee on Local Sections of the Society on the question of how best to develop the activities of the Local Sections, reported that the Committee had studied the questionnaire and had prepared answers thereto. On motion, duly seconded, this report was adopted, with a request that it be sent to Chairman Richard L. Humphrey of the Committee on Local Sections and to Secretary John H. Dunlap of the Society.

In connection with Secretary Dunlap's proposed visit to the Duluth Section, the Secretary announced that the regular Section meeting would be postponed from November 19 to November 22, 1923, and the Entertainment Committee was instructed to prepare the necessary program.

On motion, duly seconded, Secretary Zimmermann was also instructed to invite Vice-President Anson Marston and Director George H. Fenkell to visit the Section with Secretary Dunlap.

On motion, duly seconded, the matter of the distribution of copies of papers presented before the Section to members of the Section was referred to the Board of Directors for action.

On motion, duly seconded, owing to the lateness of the hour, Mr. Darling was asked to postpone his address on "Our Western National Parks" until some future meeting.

#### MEETING OF NOVEMBER 22, 1923

A regular meeting of the Duluth Section was held on November 22, 1923; President T. F. McGilvray in the chair; Walter G. Zimmermann, Secretary; and present, also, 26 members and 12 guests.

The meeting was preceded by a dinner in honor of Secretary John H. Dunlap.

President McGilvray introduced Secretary Dunlap who addressed the meeting on the work of the Society and of the Local Sections, touching on the influence of the engineer in public affairs and presenting a résumé of the program of the Fall Meeting of the Society at Richmond, Va. At the conclusion of the address, on motion, duly seconded and carried, a vote of thanks was extended to Secretary Dunlap and also to the Board of Direction of the Society for sending Mr. Dunlap to visit the Local Sections.

Brief addresses were also made by Messrs. Walter G. Swart, President of the Northern Minnesota Section of the American Institute of Mining and Metallurgical Engineers, Frank M. Buchanan, of Montreal, Que., Canada, and L. B. Arnold, Manager of the Land Department of the Duluth and Iron Range Railroad and the Chicago, Rock Island and Pacific Railway, all of whom were guests at the dinner.

The report of the Committee on "Waste in the Building Industry" was presented by Chairman J. H. Darling and read by Mr. Fixen.

After a short discussion of the subject, on motion, duly seconded, and carried, the report was accepted with the understanding that it should be spread on the minutes of the meeting and a copy sent to Secretary Dunlap. Furthermore, that the Committee be extended a vote of thanks and be discharged.

Secretary Dunlap thanked the Committee for its work and discussed briefly the formation of a Construction Division of the Society, and the report was also discussed by Messrs. Stack, Darling, and Taylor.

#### MEETING OF DECEMBER 17, 1923

A regular meeting of the Duluth Section was held on December 17, 1923; Vice-President O. H. Dickerson in the chair; Walter G. Zimmermann, Secretary; and present, also, 21 members.

The minutes of the meeting of November 22, 1923, were read and approved.

A report by the committee appointed by President T. F. McGilvray to draft resolutions on the death of William Baird Patton, M. Am. Soc. C. E., a member of the Section, was read by the Secretary, and was approved by all members rising.

A communication from Secretary John H. Dunlap of the Society was read by the Secretary expressing thanks to the Section for the entertainment pro-

vided during his visit in Duluth and requesting that a committee be appointed to prepare a memoir of the late Mr. Patton for publication by the Society.

The letter from Mr. W. C. Brockway on the question of the selection of technical books for purchase by the Public Library was, on motion, duly seconded, referred to the Library Committee.

After an informal discussion of the question of sending speakers to the Student Chapter of the University of North Dakota, as suggested by Secretary Dunlap, the Secretary was instructed to confer with the Secretary of the Student Chapter in regard to the matter. It was also suggested that the Duluth Engineers' Club take up the question of a collection of lantern slides suitable for talks on subjects pertaining to Duluth and vicinity.

Relative to the appointment of a Local Committee on Membership, it was announced that the Board of Directors had decided that the members of the Board should act as such Committee for the Section and that this action had received the approval of Secretary Dunlap.

Mr. John H. Darling, the speaker of the evening, presented a very interesting and instructive paper on "Our National Parks and a Visit to Some of Them". On the conclusion of his address, Mr. Darling was extended a vote of thanks by the members present.

#### MEETING OF JANUARY 21, 1924

A regular meeting of the Duluth Section was held on January 21, 1924; President T. F. McGilvray in the chair; Walter G. Zimmermann, Secretary; and present, also, 25 members and 4 guests.

The minutes of the meeting of December 17, 1923, were read and approved.

The Secretary presented communications from Mrs. Patton acknowledging with thanks the resolutions adopted by the Section on the death of William Baird Patton, M. Am. Soc. C. E.; from Mr. Richard B. Black, Secretary-Treasurer of the North Dakota Student Chapter, relative to supplying a speaker from the Section before a future meeting of the Chapter, which matter was referred to the Board of Directors for action; and from Secretary John H. Dunlap in reference to a report on the improvement of the St. Lawrence River, which matter was also referred to the Board of Directors.

Mr. Fred Ward, Superintendent of the St. Louis County Work Farm, presented an interesting and instructive talk on the development and operation of the Work Farm.

Mr. W. H. Hoyt who acted as the Section's representative at the Annual Meeting of the Society, in New York, N. Y., and also at a Conference of the Local Section Representatives held at the same time, gave a brief report of these meetings.

On motion, duly seconded, Messrs. Ward and Hoyt were given a vote of thanks.

#### Meeting of the Illinois Section

A meeting of the Illinois Section was held at the Chicago Engineers' Club, Chicago, Ill., on November 26, 1923; President H. R. Safford in the chair; W. D. Gerber, Secretary; and present, also, 33 members and guests.

The meeting was preceded by an informal dinner and reception in honor of Secretary John H. Dunlap of the Society. Secretary Dunlap addressed the meeting in regard to matters pertaining to the Society in general and was followed by A. N. Talbot, Past-President, Am. Soc. C. E., and Director T. L. Condron, who were also guests of the Section.

At the business meeting which followed, the following officers were elected for the ensuing year: President, Murray Blanchard; Vice-President, T. L. D. Hadwen, and Secretary-Treasurer, W. D. Gerber.

As requested by the Board of Direction of the Society, a Membership Committee was also elected.

The members of the Executive Committee of the Section for 1924 are as follows: Messrs. Murray Blanchard, T. L. D. Hadwen, C. B. Ball, H. R. Safford; and W. D. Gerber.

### Annual Meeting of the Kansas Section

The Annual Meeting of the Kansas Section was held on December 13, 1923, at the Innes Tea Room, Wichita, Kans.; President C. M. Buck in the chair; F. W. Epps, Secretary; and present, also, 15 members and 4 guests.

Messrs. W. C. McNown and P. L. Brockway were appointed Tellers to canvass the ballots for officers for 1924, and Messrs. L. E. Curfman and F. F. Frazier were appointed a Committee to audit the accounts of the Treasurer.

The minutes of the previous meeting of the Section were read and approved, and the Annual Report of the Secretary was presented.

The following officers were elected for the ensuing year: President, H. A. Rice; Vice-President, L. B. Smith and Secretary-Treasurer, F. W. Epps.

After the Committee appointed to audit the books of the Treasurer was presented, the Annual Report of the Treasurer was read.

An invitation was extended to all members of the Society present at the meeting by Messrs. P. H. Everhard, P. L. Brockway, and C. A. Forter, the Wichita members, to attend a dinner to be held at the Hotel Lassen. This invitation was accepted by 10 members of the Section.

The meeting was addressed by Mr. Clark Jacoby whose subject was "Flood Conditions and Flood Control on Kansas Streams".

### Annual Meeting of the Kansas City Section

The Annual Meeting of the Kansas City Section, which was preceded by a dinner, was held at the University Club, Kansas City, Mo., on January 8, 1924; Mr. John B. Hanna in the chair; H. C. Tammen, Secretary; and present, also, 28 members and 2 guests.

The Annual Report of the Secretary-Treasurer, which showed a membership of 80, as compared with 66 the previous year, and a balance in the Treasury of \$186.93, was read and approved.

The following officers were elected for 1924: President, Wynkoop Kiersted; Vice-President, Paul McGeehan; and Secretary-Treasurer, E. C. L. Wagner.

On motion, duly seconded, Mr. A. C. Everham was appointed to represent the Section at the Conference of Local Section Representatives to be held



at the time of the Annual Meeting of the Society in New York, N. Y., on January 17, 1924.

President Stayton presented a letter from Secretary John H. Dunlap of the Society, requesting suggestions for the program for the 1926 Spring Meeting of the Society, which is to be held in Kansas City at the invitation of the Section. After a number of suggestions had been made, which led to an interesting discussion of engineering activities in this part of the country, the Secretary was instructed to write to all members of the Section, requesting suggestions for such program, the answers to be canvassed by Directors of the Section before suggestions are made to the Society.

### Annual Meeting of the Nashville Section

At the Annual Meeting of the Nashville Section which was held at the Chamber of Commerce Building, Nashville, Tenn., on February 4, 1924, the following officers were elected for the ensuing year: President, C. N. Bass; Vice-President, E. B. Wilkinson; and Secretary-Treasurer, L. C. Anderson.

### New York Section Participates in Joint Meeting

A Joint Meeting of the New York Sections of the Society, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers, was held at the Engineering Societies Building, New York, N. Y., on January 9, 1924; Chairman L. F. Moorehouse, of the New York Section, American Institute of Electrical Engineers, presiding; and present, also, 950 members and guests.

The subject for discussion, "The Electric Systems of New York and New Jersey", was opened by Philip Torchio, Chief Electrical Engineer of the New York Edison Company, who described the generating and transmission system of Greater New York and explained the methods for handling suddenly increased loads and the central control system. The transmission system of New Jersey was discussed by R. N. Conwell, Transmission Engineer of the Public Service Electric Company of New Jersey, who stated that the initial step in the development of connections of the larger power systems has been in the form of a submarine cable tie across the Delaware River, between the Southern Division of the Public Service Electric Company and the Philadelphia Electric Company.

Discussion on the subject was opened by John W. Lieb, Vice-President of the New York Edison Company, who stated the need of standardization of voltages and frequencies and prophesied that a great industrial expansion would bring further demands on the resources of the electric supply companies.

Mr. Lieb was followed by Charles B. Grady, Mechanical Engineer of the New York Edison Company, who described the construction and operation problems in connection with large power stations, and Farley Osgood, Vice-President and General Manager of the Public Service Electric Company of New Jersey, who discussed the great strides and changes made in the evolution of the electrical industry and the great difficulty of determining future loads. The subject was also discussed by other members present.

### Annual Meeting of the Northeastern Section

The Annual Meeting of the Northeastern Section was held at the Boston City Club, Boston, Mass., on January 26, 1924; President Lewis E. Moore in the chair; Charles W. Banks, Secretary; and present, also, 48 members and guests.

The minutes of the meeting of November 10, 1923, were approved as printed.

President Moore announced the appointment of Messrs. A. D. Weston and R. K. Hale as an Auditing Committee and also the appointment by the Executive Committee of the Section of Mr. P. D. G. Hamilton as Councilor to the Affiliated Technical Societies to fill the unexpired term of Mr. J. H. Manning, resigned.

The Annual Reports of the President and of the Secretary-Treasurer were presented and approved as read.

The following officers were elected for the ensuing year: President, P. D. G. Hamilton; Vice-President, Charles H. Pierce; Secretary-Treasurer, Charles W. Banks; and members of the Executive Committee, Messrs. Clinton D. Thurber and Edward H. Cameron.

Director Frank E. Winsor, of District No. 2, who was a guest of the Section, addressed the meeting, commenting on the activities of the Society and the work of the Board of Direction.

Mr. Edward Dana, General Manager of the Boston Elevated Railway Company, who was also a guest, spoke on "The Boston Elevated as We Should Understand It". Mr. Dana gave a very comprehensive and interesting account of the conditions of management and operation of the Boston Elevated System.

### Dinner Meeting of the Pittsburgh Section

A dinner meeting of the Pittsburgh Section was held on January 7, 1924, at the William Penn Hotel, at which Vice-President C. E. Grunsky, of the Society, was the guest of honor, 50 members being present.

Vice-President George S. Davison, as Toastmaster, introduced Vice-President Grunsky who spoke on the relation of the engineer to present-day problems. In the course of his address, Mr. Grunsky emphasized the fact that it was much more important that the university turn out men and women well equipped to do their part in the establishment and maintenance of social and economic order throughout the world, that may endure, than merely to give the specialist a thorough knowledge of his subject.

Brief addresses were also made by Messrs. E. C. Morse, on the work of the Flood Commission of Pittsburgh; Morris Knowles on the work of the Planning Commission of Pittsburgh and the various civic clubs and technical associations; Richard Khuen, Jr., on the work being done in Pittsburgh by the Federated Engineering Council of Pittsburgh; and Norman S. Sprague on the work of the Citizens' Committee on City Plan of Pittsburgh. Professor William A. Mott also spoke briefly on the "Education of Engineers".

President James L. De Vou, of the Section, expressed the appreciation of the members for Vice-President Grunsky's visit and, on motion, duly seconded, Mr. Grunsky was given a rising vote of thanks.

### Meetings of the Rochester Section

A meeting of the Rochester Section was held on November 9, 1923, at the University Club, Rochester, N. Y.; President Edwin A. Fisher in the chair; and Stanley M. Brown, Secretary.

The meeting was preceded by a dinner in honor of Willard Beahan, M. Am. Soc. C. E., who recounted some of his experiences on pioneer railroad surveys.

On motion, duly seconded, President Fisher was instructed to appoint a committee to communicate with the Cornell University Student Chapter, offering the services of the Section in the work of the Chapter. President Fisher subsequently appointed Messrs. John F. Skinner and Stanley M. Brown as such committee.

The meeting adjourned to the rooms of the Rochester Engineering Society for a joint meeting with that Society, which meeting was addressed by Mr. Beahan on the "Engineering of Men".

#### MEETING OF DECEMBER 14, 1923

A meeting of the Rochester Section was held on December 14, 1923, at the University Club; President Edwin A. Fisher in the chair; Stanley M. Brown, Secretary; and present, also, 17 members and 3 guests.

The meeting was preceded by a dinner in honor of Glenn D. Holmes, M. Am. Soc. C. E., Director from District No. 3.

The minutes of the meeting of November 9, 1923, were read and approved.

The Secretary presented a letter from Director Holmes requesting the appointment of a Local Committee to assist in investigating applications for membership in the Society, and on motion, duly seconded, the Chairman was instructed to appoint a Committee of three to act as a Local Membership Committee. President Fisher subsequently appointed Messrs. A. M. Moss crop, W. F. Pond, and S. M. Brown, as such Committee.

For the Committee on Affiliation with the Cornell University Student Chapter, Mr. John F. Skinner introduced Professor J. F. Eckhard, of Cornell University, and R. T. Sprague, President of the Student Chapter. Professor Eckhard and Mr. Sprague extended greetings from the Chapter and suggested various ways in which the Section could assist the Chapter in its work. Director Holmes was then introduced and spoke briefly on the affairs of the Society, after which meeting was resolved into a "round table" discussion.

#### ANNUAL MEETING, JANUARY 3, 1924

The Annual Meeting of the Rochester Section was called to order on January 3, 1924, at the Powers Hotel, Rochester, N. Y.; President Edwin A. Fisher in the chair; S. M. Brown, Secretary; and present, also, 16 members and 2 guests.

The following officers were elected for the ensuing year: President, Thomas J. Morrison; First Vice-President, Charles C. Hopkins; Second Vice-President, John F. Skinner; and Secretary-Treasurer, S. M. Brown.

Vice-President Hopkins addressed the meeting for Messrs. Morrison, Skinner, and himself, thanking the Section and promising their best efforts in its work for 1924.

On motion, duly seconded, the Board of Direction of the Section was authorized to request the Committee of the Senate and House of Representatives by letter to appoint a committee to investigate and report on the improvement of the St. Lawrence River as recommended by the International Joint Commission.

The report of the Conference of Representatives of Local Sections held at Richmond, Va., on October 17, 1923, was read.

On motion, duly seconded, the President was authorized to delegate a member to represent the Section at the Annual Meeting of the Society in New York, N. Y., on January 16-18, 1924. President Fisher subsequently delegated all the local members who attended the Annual Meeting of the Society as representatives of the Section.

On motion, duly seconded, Mr. John F. Skinner was recommended to address the Cornell University Student Chapter for the Section.

President Fisher was authorized, on motion, duly seconded, to appoint a committee of three to represent the Section at the hearings before the Common Council on the new Building Code for the City of Rochester, and it was also suggested that this committee co-operate with similar committees from other interested groups.

Messrs. J. Bevaqua, a member of the Cornell University Student Chapter, and Harry Bolton, a member of the Student Chapter at the University of Cincinnati, were introduced, following which Mr. Bolton addressed the meeting on the co-operative course given at the University of Cincinnati.

As the Retiring President, Mr. Fisher addressed the meeting on the pleasure it had given him to act as the first presiding officer of the Section and thanked the members of the Section for the honor.

### Meeting of the St. Louis Section

At the meeting of the St. Louis Section held in November, 1923, the following officers were elected for the ensuing year: President, Baxter L. Brown; Vice-President, S. Bent Russell; and Secretary-Treasurer, John C. Pritchard. Mr. William E. Rolfe was elected to represent the Section on the Associated Engineering Societies.



## Minutes of Meetings

### Report in Full of the Seventy-First Annual Meeting, January 16, 1924

#### Morning Session

**Wednesday, January 16, 1924.**—The Seventy-First Annual Meeting of the Society was called to order in the Auditorium of the Engineering Societies Building, New York, N. Y., at 10:15 A. M., President Charles F. Loweth in the chair; John H. Dunlap, Secretary; and present, also, about 370 members and guests.

**THE PRESIDENT.**—I call to order, at this time, the Seventy-first Annual Meeting of the American Society of Civil Engineers.

The first order of business is to announce that Tellers have been appointed to canvass the ballot for officers. The names of the Tellers will be read by the Secretary.

(The Secretary read the names of the Tellers.\*)

**THE PRESIDENT.**—These Tellers are now engaged in canvassing the ballot, and the report of the canvass will be announced later at this session.

The next order of business is the report of the Board of Direction, which will be read by the Secretary.

**THE SECRETARY.**—Mr. President, copies of this report are available and are in the hands of the members present. The statistical parts of the report will not be read.

(The Secretary presented the report of the Board of Direction.†)

**THE PRESIDENT.**—I shall ask the Secretary to abstract the outstanding features of his report for the year ending December 31, 1923.

(The Secretary presented an abstract of his report.‡)

**THE PRESIDENT.**—It is customary at this time to have the report of the Treasurer of the Society, which I will ask him to present.

**THE TREASURER.**—Mr. President and Gentlemen, the substance of the report§ has been covered by the figures given in the report of the Secretary. I wish only to call attention to, and express approval of, the policy of covering the funds of the Society by definite investments. That has now been accomplished. It is something that has been desired by many members. The General Balance Sheet enumerates the investments and funds in detail.

**THE PRESIDENT.**—Has any member any inquiry to make with reference to any of these reports?

Next on the order of business is the report of the Alfred Noble Memorial Committee, of which Mr. Samuel Rea is Chairman. The report will be presented by Mr. Robert Ridgway, Secretary of the Committee.

\* See p. 152.

† See p. 224.

‡ See p. 242.

§ See p. 246.

ROBERT RIDGWAY, M. AM. SOC. C. E.—Mr. President and Gentlemen, I have the report signed by Samuel Rea, Hon. M. Am. Soc. C. E., Chairman of the Committee, which is as follows:

"AMERICAN SOCIETY OF CIVIL ENGINEERS,  
33 West 39th Street, New York City,

"GENTLEMEN.—The following is progress report of the Alfred Noble Memorial Committee for the year 1923.

"The personnel of the Committee was changed during the year by the retirement of Mr. John R. Freeman when Mr. Charles F. Loweth was elected President and became *ex-officio* member, and by the addition of Messrs. Bion J. Arnold, J. Vipond Davies, and J. W. Lieb. The Committee therefore is constituted as follows: Samuel Rea, Chairman, Charles F. Loweth (*ex officio*), Bion J. Arnold, Onward Bates, J. Vipond Davies, George Gibbs, William W. Harts, S. H. Hedges, J. W. Lieb, F. H. Newell, J. Waldo Smith, and Robert Ridgway, Secretary and Treasurer.

"On May 15, 1923, an appeal for financial support was sent to the entire membership of our Society. This was followed in September, 1923, by an appeal to the members of the Western Society of Civil Engineers, and to selected lists of members of the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, and the American Institute of Electrical Engineers. Copies of these appeals are on file with the Secretary.

"From the foregoing appeals and from considerable personal solicitation by the members of the Committee, 317 subscriptions have been received for a total of \$11 913.50. This, with the \$1 153.86 which was on hand at the beginning of the year, with allowance for interest and minor deductions for bank exchange, gives a balance on December 31, 1923, of \$13 190.68. This balance includes a \$1 200 loan from the Society, and printing bills for the appeals amounting to \$1 022.75.

"The Society has generously appropriated \$500 to help to defray the expense of issuing the two appeals, and it is hoped that an appropriation for the balance of the bill amounting to \$522.75 may be made by the Society at this time so that there may be no depletion of the fund collected.

"Only a small portion of the membership has thus far contributed to this fund, and in order to assure the erection of this tribute to the Engineering Profession in our Capital, it is desired that each member will at the earliest opportunity make such response as his means permit.

"Respectfully submitted,

"SAMUEL REA, *Chairman.*"

MR. RIDGWAY.—Mr. President, the estimated cost of this Memorial is about \$100 000. The design has been made by one of the most notable sculptors in the United States. Only \$13 000 is in the hands of the Committee, 13% of the amount required. The design will be an ornament to the National Capital and a memorial of which all engineers should be proud. If every engineer in the country would contribute even a small amount, the Committee would soon have in its hands a sufficient sum to proceed with the work. Will you please keep this in mind and do what you can to help your Committee in accomplishing its work?

THE PRESIDENT.—The Board of Direction desires to call the attention of the membership especially to this report. Reviewing the situation briefly: A few years ago the Society inaugurated the project of erecting a memorial to

the late Alfred Noble, an honored President of this Society and a member of many other engineering societies.

Then came the World War, and that and other circumstances have combined to make this notable project lag by the wayside. It is hoped now that, under the competent management of the present Committee, it can be accomplished; but this can only be done by the thoughtfulness and the generosity of the membership of this Society. Now, it is not so much generosity that is needed as thoughtfulness. If all the members would contribute something, a very little from each one would meet the requirements of the Committee; but just to the extent that a few of us, or perhaps many of us, neglect to give anything, the difficulty of raising the funds that are necessary to accomplish this project will be increased.

It will be a lasting disgrace to the Engineering Profession, and to this Society especially, if we cannot very shortly make a success of this memorial. Unless a motion to the contrary is made, it will be considered that the report of the Alfred Noble Memorial Committee, together with other similar reports, will be referred to the Board of Direction with power.

Next in the order of business is the report of the Committee on the Columbia University Scholarship, of which Mr. Robert Ridgway is Chairman. Messrs. C. W. Hudson and J. P. H. Perry are the other members of the Committee. I shall ask Mr. Ridgway to read that report.

MR. RIDGWAY.—Gentlemen, the report is as follows:

"JANUARY 9, 1924.

"AMERICAN SOCIETY OF CIVIL ENGINEERS,  
33 West 39th Street,  
New York City.

"GENTLEMEN.—The following is the report of the Committee on the Scholarship in the Columbia School of Mines, Engineering, and Chemistry:

"This is a graduate scholarship amounting to \$350, or substantially the tuition, and has been available for the college years 1922-23 and 1923-24. Prominent notice of this matter has been given in the Society *Proceedings* in the spring of each year, and in 1923 the various Local Sections were requested to assist in securing applicants. Your Committee received last spring the first and only application which, however, was later withdrawn, due to the fact that the college work would so take up the man's time that he could not earn his upkeep.

"Your Committee would recommend for the coming year:

"1st.—That in the spring appropriate notice again be given in the *Proceedings*.

"2d.—That a special notice be sent to each Local Section requesting that effort be made to secure suitable candidates.

"3d.—That the New York Local Section, in view of a probably greater local interest in a New York scholarship, be urged to make especial effort in this matter.

"Respectfully,

"ROBERT RIDGWAY, *Chairman*."

MR. RIDGWAY.—The Committee was much disappointed and much surprised that no interest seemed to be shown by the membership at large in this

matter. As the report states, only one application was received, and that was after the scholarship had been advertised very extensively through the *Proceedings* and the Local Sections.

It seems singular that a gift like this should go begging; and it is hardly courteous to the authorities of Columbia University to neglect it in this manner. I hope, therefore, that the members will exert themselves to find candidates who will be interested in this scholarship.

THE PRESIDENT.—Unless some other disposition of this report is desired, it will be received and referred to the Board of Direction with power.

Next, in the order of business is the report of the Committee on Effects of Earthquakes on Engineering Structures, with especial reference to the Japanese earthquake of September 1, 1923. In reference to this report, I would explain to the members that soon after the earthquake which destroyed considerable portions of two large cities of Japan, the members of the Board of Direction thought there might be an opportunity to learn something about the effect of earthquakes on engineering structures, and a committee was appointed, made up largely of men who had made similar investigations previously. This Committee is to be assisted by some Japanese engineers and by engineers in other sections of the United States, and it is hoped that, in time, it will present a report that will be of considerable value.

It was thought that it would be interesting at this time to have a statement as to the outline of the investigation intended to be made by this Committee. I shall ask Col. John Millis, a member of the Committee, if he is here, to make such statement. Is Col. Millis here? If not, Mr. Secretary, will you read the statement?

(The Secretary presented the program of the Special Committee on Effects of Earthquakes on Engineering Structures.\*)

THE PRESIDENT.—Unless some other disposition is desired, this report will also be referred to the Board of Direction with power. It is so referred.

I see in the audience a man who has been very much interested in the Engineering Profession, a man whom you will recognize as soon as his name is mentioned. He has been invited to come to the platform. I refer to Ambrose Swasey, Hon. M. Am. Soc. C. E. Mr. Swasey has been so interested in Engineering Research that he has contributed \$500 000 to Engineering Foundation, of which doubtless you are all advised.

We should also be pleased to have with us on the platform, Mr. James Hartness, former Governor of the State of Vermont, who has recently been elected President of the Federated American Engineering Societies.

Mr. Hodgman, the Chairman of the Local Committee on Arrangements, has some announcements to make.

(Mr. Hodgman made announcements relative to arrangements for entertainments, excursions, etc.)

THE PRESIDENT.—The time has come for the conferring of the degrees of Honorary Membership on two of our members who have been considered by the Board of Direction as eminently worthy of that honor. It is a very happy



provision of the Constitution that it is possible for the Society to honor men who have been recognized by the profession for eminence and for service, and it is a very happy thought that in honoring them the Society honors itself.

After careful consideration, the Board of Direction decided that Mr. Onward Bates, of Chicago, Ill., and Mr. Desmond FitzGerald, of Brookline, Mass., both of whom are Past-Presidents of the Society, should be honored this year by giving them Honorary Membership in the Society. Unfortunately, Mr. Bates' health is such that it was felt unwise for him to come to New York to receive this honor, and, at his request, his old, lifetime friend, Mr. Charles L. Strobel, will represent him on this occasion. Mr. Pegram, will you present Mr. Bates?

GEORGE H. PEGRAM, PAST-PRESIDENT, AM. SOC. C. E.—I have the honor of presenting Mr. Onward Bates for Honorary Membership.

Mr. Bates was born in Missouri in 1850. He served an apprenticeship in a foundry and machine shop, was Inspector of iron work on the St. Charles and St. Louis Bridges, after which he attended the Rensselaer Polytechnic Institute (1871-1873), which institution conferred on him the degree of Doctor of Engineering in 1918. He has also received the Honorary Degree of Civil Engineer from the University of Wisconsin.

After serving as engineer and inspector on several important bridges under the late distinguished engineers, Thomas D. Lovett, L. G. F. Bouscaren, C. Shaler Smith, Members Am. Soc. C. E., and D. J. Whittemore, Past-President, Am. Soc. C. E., Mr. Bates was sent in 1878 to Australia and New Zealand as representative of the Edgemoor Iron Company to introduce American bridges in those Colonies. The colonists were naturally favorable to the English riveted construction with which they were familiar, as opposed to the American pin-connected construction. A prejudice of this kind is not easily overcome.

Among Mr. Bates' arguments was the proposal to build and test a bridge span at his Company's expense, provided his competitors would do likewise, so that the merits of the two types of construction might be determined. He succeeded in securing contracts for three important bridges in Australia, which was regarded as a great accomplishment.

I first became acquainted with Mr. Bates through his letters at that time, and was impressed with the clear and forceful English which has so characterized his writings.

Mr. Bates was subsequently associated with the late Col. C. Shaler Smith, the noted Bridge Engineer, and the Edgemoor Iron Company, was President of the Pittsburgh Bridge Company, and served for seven years as Engineer of Bridges and Buildings of the Chicago, Milwaukee and St. Paul Railway (covering 6 000 miles of line), after which he devoted his time to the private practice of engineering.

A record of this kind gives only a meager idea of his accomplishments, but time will not permit of greater detail.

Mr. Bates' extensive and conspicuous services as an Arbitrator, since his nominal retirement from the active practice of his profession, contain such

an interesting lesson in engineering arbitration, that is, arbitration in which engineers are better qualified to determine the issues than men of other professions, that I am constrained to speak more fully in regard to them.

"Blessed are the peace makers", and signally honored is one chosen for such work, for he must be chosen. Such work cannot be solicited. Undoubtedly gifted by heredity from a father who was a distinguished Judge in Missouri, and a grandfather who was Attorney-General in President Lincoln's Cabinet, Mr. Bates has that judicial temperament which enables him to bring his wide experience to the settlement of disputes. In 1912, the Western Society of Engineers awarded Mr. Bates the "Chanute Medal" for his paper on "Engineering Arbitration."

The field of Engineering Arbitration should be extended. It is the ideal method of settling disputes between parties who desire a just arbitrament. No engineer could wish for greater distinction than to be chosen to act as Arbitrator between men who have been his equals or superiors in the practice of his profession. In seven of the eight notable cases in which Mr. Bates has acted as Arbitrator for railroads, he was the choice of all parties. In four cases, he was the sole Arbitrator.

It seems unnecessary to speak of Mr. Bates' services to his profession, which are so well known. Past-President of this Society, and on its Board of Direction for eleven years, a Member of the Institution of Civil Engineers of Great Britain, Past-President of the Western Society of Engineers, Trustee of the Chicago Bureau of Efficiency, Member of the Franklin Institute, Theta Xi, and Royal Society of Arts—these connections alone would indicate his interest in his profession; but his great service is better evidenced by the numerous appeals that have been made to him by his professional brethren for assistance in solving various problems of professional development.

I now ask you to confer on Mr. Bates, through Mr. Strobel, who represents him, Honorary Membership in the American Society of Civil Engineers.

THE PRESIDENT.—Mr. Strobel, representing Mr. Bates as you do on this occasion, in behalf of the American Society of Civil Engineers, I will ask you to give Mr. Bates this diploma of Honorary Membership which this Society feels is due him in all honor, and by which in awarding him the Society feels that it honors itself. Please convey to Mr. Bates our regret that he is not here to receive this honor.

CHARLES L. STROBEL, M. Am. Soc. C. E.—Mr. President, by way of introduction I wish to say that although Mr. Bates is not well enough to be here to-day, he was able and willing to compose the remarks he wished me to make, and I think I cannot do better than read them to you. I will add that he and I were associated in engineering work as long as forty-eight years ago, and, as one of his oldest friends, I personally feel very much gratified that he is to-day the recipient of this high honor. His remarks are as follows:

"I have asked Mr. Strobel to represent me on this occasion with the explanation that my present state of health does not permit me to appear in person, which is a grief to me, for it would be my duty and pleasure to stand before you at this time if it were possible. I wish to say that if I were in robust health I could not adequately express my gratitude for this honor, so precious

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to one who loves his profession, awarded as the honor is by a jury of his peers. I well remember that day forty-two years ago when my election to membership stirred my ambition and bound me in loyalty to our Society. That election gave me the rank of Civil Engineer and the privilege of comradeship with members of the American Society of Civil Engineers. Since that time, it has been my desire and effort to keep pace with my fellow members, whose achievements are such that when reviewing my own life I can only feel that I am still a youth on the lower rungs of the engineering ladder. In the meantime, our Society, through the composite efforts of its membership, has grown in numbers and advanced in dignity and prestige until its rewards are not exceeded in value by those of any other authority. When our Society confers Honorary Membership upon a member who rates himself as an average engineer, it must serve as a token of encouragement to the great number of our members whom fortune has not favored with opportunities for extraordinary achievements.

"In now accepting this crowning honor at your hands, I trust I am not without a proper feeling of humility and of continued obligation to the Society."

THE PRESIDENT.—Mr. Desmond FitzGerald has also been elected an Honorary Member. I ask Mr. Leonard Metcalf to present Mr. FitzGerald.

LEONARD METCALF, M. AM. SOC. C. E.—I take pleasure in presenting to you for Honorary Membership in this Society Mr. Desmond FitzGerald of Brookline, Mass., a direct descendant of Roger Williams, first Governor of Rhode Island, born in Nassau, New Providence, West Indies, where his grandfather was President of Her Majesty's Council, educated at Phillips Exeter Academy, student in Paris, with strong leaning toward an artistic career, which has influenced his work and his pleasures.

After a short public service as Private Secretary to Gen. Burnside and Assistant to the Secretary of State of Rhode Island, ambition led him West in 1867, where he served a three-year apprenticeship in railroad construction, and on his return to the East, became Chief Engineer of the Boston and Albany Railroad.

In 1872, he began his life work in charge of the sources of supply of the Boston Water-Works, first, as Superintendent of the Western Division, later, also, Resident Engineer in Charge of Additional Supply and after the formation of the Metropolitan Water-Works of Boston, as Department Engineer under the Chief Engineer, the late Frederic P. Stearns, Past-President, Am. Soc. C. E.

Mr. FitzGerald designed and constructed some of the largest and most important storage reservoirs built by the city and, as Superintendent, had charge of their maintenance. During this period, his attention was arrested by the problem of maintaining the purity of water supplies and their sources. He did pioneer work in making a thorough study of the conditions on Pegan Brook in Natick, Mass., one of the sources of Lake Cochituate, which was polluted by manufacturing wastes and municipal sewage. With the friendly assistance of the City Attorney, he brought suit to compel the elimination of pollution, which was one of the first, if not the first, suit of its kind in the United States. For seven years this suit was fought actively from Court to Court, until it reached the Supreme Court of the Commonwealth, where the

case was won. This litigation advanced greatly the cause of pure water supplies in this country.

His study of methods for reducing the color in water led to the systematic draining of swampy areas and the bleaching of water by the action of the sun.

He was the first to design and put into practice, before the days of filtration, the stripping from reservoir sites of all soil containing organic matter and the eliminating of shallow flowage on the margins of reservoirs.

Mr. FitzGerald established the first and, for many years, the only biological laboratory operated in this country in connection with a water-works system, and carried out many investigations in hydraulic engineering. These have been reported through the *Transactions* of this Society. Among the most important of his papers are: "Evaporation"; "Temperature of Lakes"; "Rain-fall, Flow of Streams and Storage"; and "Flow of Water in 48-Inch Pipes". Two of these papers were awarded the Norman Medal.

In 1899, he did important work as Chief Engineer of the Special Commission on the Chicago Drainage Canal.

He served on a Commission appointed by the Secretary of War to investigate the Lydecker Tunnel, for the supply of water to the City of Washington.

In 1904, he served as Consulting Engineer on the water supply and sewerage of Manila, the capital of the Philippines, and had to do with the highway connecting that city with the summer capital on the Island of Luzon.

For the Metropolitan Commission of New York, he studied the degree of cleanness necessary for the waters of New York Harbor.

He has advised many cities in this country with respect to their water-works problems and taken an active part in their water diversion suits.

Mr. FitzGerald has been much interested in civic problems and given generously of his time and experience, as Chairman of the Topographic Survey Commission of Massachusetts; as a member of the Metropolitan Commission of Boston, for which he made a study and reported on harbors; Trustee of the Brookline Public Library; Senior Warden of St. Paul's Protestant Episcopal Church in Brookline; and as an active worker during the World War period.

Mr. FitzGerald's love of the artistic has found expression in his careful study of good proportion and attractive lines for engineering structures; his study of Nature and defense of the public domain; his interest in art and photography; and in his establishment in 1913 at his home in Brookline, of the FitzGerald Art Gallery which he maintains free to the public. In the latter, he has gathered a notable collection of the work of the early French impressionists, Monet, Sisley, Pizarro, and others, and of Dodge MacKnight, and fine examples of American, Korean, and Chinese pottery.

He is a Past-President of this Society, the Boston Society of Civil Engineers, and of the New England Water Works Association.

Mr. President, the American Society of Civil Engineers honors itself in recognizing the professional career of Mr. Desmond FitzGerald, Distinguished Hydraulic Engineer, Pioneer in the Field of the Preservation of the Purity of Water Supplies, and Student of Nature and Art.

THE PRESIDENT.—Mr. FitzGerald, in behalf of the membership of the American Society of Civil Engineers, it is a pleasure to hand you this diploma of



Honorary Membership. Especially are we honored that a member of our Society, one whom we have heretofore highly honored, should have such a record of achievements as has been just read to us.

DESMOND FITZGERALD, PAST-PRESIDENT, A.M. SOC. C. E.—Mr. President and Fellow Members: This all seems like a dream to me; and I fail to recognize my own portrait in this eulogy which has been submitted for your attention. But I love the American Society of Civil Engineers and all its members. You see there is a great advantage in being one of the first. It is not merit always that wins; it is the fact of good fortune in being early in a profession.

As I look back on the history of this Society and all that it has accomplished, it seems to me that no words of mine can give any idea of my appreciation of the great work it has accomplished for the Engineering Profession. It is wonderful what this Society has done for us all; and words fail me at the very moment when I should like to express my own obligations. The fact of it is that this Society is like a good mother who is always doing something for her children; but how little the children can really do for their mother. We can only give her our love and affection in return. That is exactly the feeling in my heart at this moment. I thank you, Mr. President.

THE PRESIDENT.—The Chairman of the Local Committee, Mr. Hodgman, has one or two notices which he wishes to present.

(Mr. Hodgman made announcements relative to meetings, etc.)

THE PRESIDENT.—We come now to that part of the program which consists of the awarding of six prizes and medals, namely, the Norman Medal, the J. James R. Croes Medal, the Thomas Fitch Rowland Prize, the James Laurie Prize, the Arthur M. Wellington Prize, and the Collingwood Prize for Juniors. These prizes and medals are for papers which have been presented to the Society and which have, within certain limitations as to character and subject, outstanding excellence.

The first prize, the Norman Medal, is awarded to D. B. Steinman, M. Am. Soc. C. E., who, unfortunately, is in Australia, but who will be represented by H. D. Robinson, M. Am. Soc. C. E. I have in my hand a cable from Mr. Steinman, addressed to the American Society of Civil Engineers, which reads as follows: "Australian engineers join me in hearty greetings to American Society."

Mr. J. C. Ralston will present Mr. Robinson, who represents Mr. Steinman. J. C. RALSTON, M. AM. SOC. C. E.—I suppose that the most laudable and the most common aspiration of every engineer is to render human service.

The challenge to service has existed since the remotest antiquity. It has persisted step by step down the ages with the same growing response as man's vision of altruism has enlarged. In no department of human effort has the challenge to service been so willingly or so convincingly answered as by his creative instinct.

It has been a distant echo from the stepping stones of primitive man to the cantilever bridge of superman—from the unlettered age of flagstone shelters to the classic abodes of the modern Renaissance—from the mud huts bonded

with bamboo lacings in ancient China to the concrete monoliths held athwart the winds by reinforcing bars of carbon steel in modern Manhattan.

Every advance during that long and toilsome period in methods and in use of materials has been only a culminating step in the growth of engineering genius and in the expansion of the original aspiration of our primitive forebears.

The challenge to service was as potent then, although less universal, as it is this morning in the presence of our own honor men. The challenge has always been met by the contribution of the engineering mind, or the contributions of many engineering minds yoked in a common impulse.

The answer was given in the embattled walls and the monumental arches of Assyrian and Babylonian adventure, and in all the human epics sweeping down the ages, through an ever-swelling purpose and progress to the tragic engineering accomplishments of the World War. It was given by the masterly achievements of the priesthood of ancient Egypt. It was given by the generous sacrifices and the altruistic services of the "Brothers of the Bridge" (*Les Frères des Ponts et Chaussées*) under the religious fervor of the Crusades. The answer to the challenge of the Spartan and the Athenian generals, of the intellectual and artistic demands of the impending Golden Age of Pericles, was given by the masters of line and proportion and by the possessors of the engineering mind.

The challenge of the conquest of the Cæsars, the stately progress of the Moors, the achievements of the Anglo-Saxons, the Gauls, or the Germanic tribes, found the immortal spirit of the engineering and constructive mind, in one form or another, always pulsing with vigorous response—always accepting the challenge and always answering with service.

Too often—sadly too often—human endeavor found its common aspirations hedged about and restricted by military enterprise; but we have seen that "Peace hath her victories no less renowned than those of War."

Although the call for engineering accomplishments has been just as imperious as the demands of man's warlike spirit, yet the fruiting answers, under theegis of peace, have fallen like a copious dew upon a parched anhydrous earth. The contributions of engineering and to engineering, flowering in the cold fields of technology, are as the lilies on the peaceful ponds of industrial development. The annals of peace record that the formula of the engineer is mightier than the sword; that engineering genius is a higher gift than any which the military overlord can contribute; that the achievements of engineers are essentially the summary of individual contributions; that those achievements symbolize the stones, moiled and shapened with infinite care and dexterity, that are being laid in the majestic walls of that gleaming Parthenon of civilization destined, in the fullness of time, to glimpse the azure tints of heaven itself.

I like to think that our modern engineering spirit—this creative and constructive instinct—has welled up its contributions into an orderly and superb technology until our industrial, commercial, and economic rubrics have become the paragon tablets of all human endeavor.

These contributions consist not only of bold and monumental constructions, but also of research in physics, chemistry, and mathematics, or in the

codification of their criteria. The professional papers of our members, I venture to believe, are some of the classical tributes—some of the sterling contributions—which we delight to lay in modesty on the altar of progress.

It is some of these contributions, however great or small, however modestly rendered, that have inspired this Society to inaugurate such proceedings as these we are now having. The Society steps aside, for a brief moment, in its multi-functional duties, to do honor to itself and to its annually chosen champions and to present some modest expression of appreciation. It is the same spirituality that Emerson phrased in didactic epigram when he said "if a man can preach a better sermon, or write a better book" [I like to add "or design a better bridge"], "or build a better mousetrap than his neighbor, though he live in the wilderness, the world will make a beaten path to his gate."

It is at this gate of remembrance, these portals of recognition, that I have the pleasure and the honor of presenting to you, Mr. President, and through you, to the Society, Dr. David B. Steinman, Member of the American Society of Civil Engineers, winner at this time of the Norman Medal for his recent paper on "Locomotive Loadings for Railway Bridges".

A professional engagement has recently called Dr. Steinman to Australia. In his absence he has nominated Holton D. Robinson, M. Am. Soc. C. E., as his temporary substitute to accept for him and in his stead the honor which you, as President, are about to confer. I present Mr. Robinson.

THE PRESIDENT.—Mr. Robinson, as representative of Mr. Steinman, I present to you this Norman Medal, which is given to him in recognition of his paper entitled "Locomotive Loadings for Railway Bridges," for its merit as a contribution of Engineering Science.

HOLTON D. ROBINSON, M. AM. SOC. C. E.—In response to this honor I take occasion to read the following message that Mr. Steinman has sent to the Society:

"TO THE MEMBERS OF THE

AMERICAN SOCIETY OF CIVIL ENGINEERS:

"I sincerely regret that I cannot be present on this occasion. In my absence, I have asked my friend and partner, Holton D. Robinson, M. Am. Soc. C. E., to represent me and to read these few words of grateful greeting for me.

"I am deeply sensible of the honor which has just been conferred upon me. When I undertook the investigations on the subject of 'Locomotive Loadings for Railway Bridges', my aim was simply to contribute some studies to a subject which I believed to be of interest to the Profession. After the presentation of this paper, I was most agreeably surprised and not a little touched by its generous reception. The interest shown and the many expressions of appreciation have richly rewarded me for my work.

"In accepting the Norman Medal, I want to record my earnest gratitude to the American Society of Civil Engineers for this token of approval, which I shall prize more highly than any honor or reward that has ever before been conferred upon me. To me, it will be an encouragement to continued effort to give the best I have to the Society and to the Profession which it represents.

"D. B. STEINMAN, M. AM. SOC. C. E."

THE PRESIDENT.—The next in order is the J. James R. Croes Medal, and I will ask Mr. Robert Ridgway to present James F. Sanborn, M. Am. Soc. C. E., for this prize.

MR. RIDGWAY.—It is my privilege to present to you for the award of the James R. Croes Medal, James Forrest Sanborn, M. Am. Soc. C. E., of New York, N. Y. The award is recommended for the paper on "Engineering Geology of the Catskill Water Supply", of which Mr. Sanborn and Dr. Charles P. Berkey, Professor of Geology at Columbia University, were co-authors. Dr. Berkey is not a member of the Society, otherwise, he would share the honor of the award with Mr. Sanborn, and I would be glad if he could do so.

Notwithstanding its importance to Civil Engineers, little appears in our records on the subject of engineering geology. The Society is, therefore, particularly indebted to the authors of this paper for their valuable contribution to *Transactions*. Both were well qualified for their task. Mr. Sanborn gave particular attention to Mining and Geology during his course in the Lawrence Scientific School, Harvard University, from which he was graduated in 1899, and Dr. Berkey, as before stated, is Professor of Geology at Columbia University. The authors were connected with the great Catskill project, practically from its inception until the main features of the work were completed, Mr. Sanborn as Division Engineer and Dr. Berkey as Consulting Geologist. They have succeeded in preparing such an interesting and comprehensive paper that the reader derives from it enjoyment as well as instruction.

It is a special pleasure for me to introduce Mr. Sanborn. We were associated for many years on the construction of the Rapid Transit Subways of this city as well as the Catskill Aqueduct, and long ago I learned to know him as an engineer of broad vision, a constructor of much ability, a citizen with deep rooted American ideals, and a man among men.

Mr. President, I present to you Mr. Sanborn for the award of the J. James R. Croes Medal.

THE PRESIDENT.—Mr. Sanborn, it gives me great pleasure to present to you on behalf of the American Society of Civil Engineers the J. James R. Croes Medal, which is awarded to you for the outstanding excellence of your paper.

JAMES F. SANBORN, M. AM. SOC. C. E.—Mr. President and Gentlemen, I thank you.

THE PRESIDENT.—The next prize is the Thomas Fitch Rowland Prize which has been awarded to Mr. Frank William Peek, Jr. Mr. Peek will be presented by Mr. F. B. Jewett.

F. B. JEWETT, ESQ.—Mr. President, it gives me great pleasure to introduce to you Mr. Frank William Peek, Jr., who has been awarded the Thomas Fitch Rowland Prize for his paper on "High-Voltage Power Transmission".

Mr. Peek is an outstanding figure in the Electrical Profession and a notable example of the modern engineer whose work is grounded firmly on the results



of scientific research. His brilliant researches in the field of high-voltage electrical transmission and of dielectric phenomena, have materially assisted in the solution of problems connected with the transmission of electrical energy over long lines and have been of the utmost benefit to all users of electrical power. In addition to these technical accomplishments, Mr. Peek's good judgment and winning personality have surrounded him with a host of friends.

Mr. Peek is a native of California and was graduated from Leland Stanford, Jr., University in 1905. His first commercial work was done during college vacations at the electric plant of the Pacific Gas and Electric Company.

In 1905, Mr. Peek entered the employ of the General Electric Company and was assigned to special engineering research work. From 1907 to 1909, he was engaged on general transmission problems in the Power and Mining Engineering Department. At this time, he started his researches on "Corona", which prepared him for his work in high-voltage transmission.

During the summers of 1907 and 1908, Mr. Peek made a special study in the mountains of Colorado on lightning and its effect on transmission lines. From 1909 to 1910, he investigated the problems connected with 250-kv-a. transmission, and it was at this time that he established the first laws of "Corona" and put them in form for practical application to transmission problems.

In 1909, when the late Dr. Charles P. Steinmetz organized the Consulting Engineering Department of the General Electric Company, Mr. Peek was one of the first to join it. During 1910, he lectured at Union College and, in 1911, the degree of Master of Electrical Engineering was conferred on him by the College for work done in connection with high-voltage transmission.

Mr. Peek has prepared many valuable and authoritative papers which have been read before the leading scientific and engineering societies of the United States. These papers include articles on: The laws of "Corona"; measurements of high voltages; lightning and transmission voltages; dielectric strength of air, oil, and solid insulation; high-voltage phenomena; and, also, many other papers on high-voltage engineering problems, transmission-line calculations, etc.

In addition to the very large number of technical papers which Mr. Peek has contributed to American and foreign journals, he has also written a book on dielectric phenomena and high-voltage engineering which is used as a reference and textbook in all the leading colleges and libraries of the world and particularly in Japan, France, Belgium, and England. Many of his papers and lectures have also been translated into various languages and used in foreign as well as American colleges.

Numerous inventions relating to high-voltage insulations, transmission lines, lightning arresters, electro-chemical subjects, etc., are credited to Mr. Peek.

Mr. Peek has always supported enthusiastically the activities of the various technical societies with which he has been associated, and his ability to co-operate with his fellowmen has been instrumental in bringing about marked advances in all the work which he has undertaken.

In conclusion, Mr. President, permit me to say that in honoring Mr. Peek, your Society is honoring the whole Electrical Profession, and on behalf of my colleagues in the American Institute of Electrical Engineers, I wish to thank you and your Society for this generous recognition of meritorious accomplishments in an allied field.

THE PRESIDENT.—Mr. Peek, on behalf of the American Society of Civil Engineers, I present to you the Thomas Fitch Rowland Prize, consisting of \$60 in cash and an engraved certificate, because of the excellence of your paper entitled "High-Voltage Power Transmission."

F. W. PEEK, JR., ESQ.—Mr. President and Members of the American Society of Civil Engineers: As a member of one of the younger engineering societies, the American Institute of Electrical Engineers, I considered it a great privilege to present my paper on "High-Voltage Power Transmission," at the Fall Meeting of this Society held in San Francisco, Calif., in October, 1923, and I deem it an honor indeed to be awarded this prize.

THE PRESIDENT.—The James Laurie Prize has been awarded to Roy W. Gausmann, M. Am. Soc. C. E., and C. M. Madden, Assoc. M. Am. Soc. C. E., and I will request Mr. George G. Honness to present them.

GEORGE G. HONNESS, M. AM. SOC. C. E.—Mr. President and Members of the American Society of Civil Engineers: It is with a feeling of great personal satisfaction that I present to you the winners of the James Laurie Prize.

Both these men have gained practically their entire professional experience with the Engineering Bureau of the New York Board of Water Supply in the construction of the Catskill System. Both served their country during the World War, and saw service overseas. Both returned from that great struggle, and took up their regular duties.

As planned, the Gilboa Dam is a stepped overfall section with risers and treads of unprecedented height and width. To these men was assigned the construction of models to determine the probable behavior of flow over the full-scale structure. The experiments were extensive and spread over a considerable period of time. To the task they both faithfully devoted themselves and did a large amount of painstaking and ingenious work. The experiments led to a modification of the plans for the dam and resulted in the paper entitled "Experiments with Models of the Gilboa Dam and Spillway."

Mr. President and Members of the Society, it is with great pleasure that I present to you Mr. Roy W. Gausmann and Mr. Charles M. Madden, winners of the James Laurie Prize.

THE PRESIDENT.—It gives me great pleasure in behalf of the American Society of Civil Engineers, to present to you, Mr. Gausmann, and to you, Mr. Madden, these engraved certificates and this cash prize, because of the excellence of your joint paper entitled "Experiments with Models of the Gilboa Dam and Spillway."

ROY W. GAUSMANN, M. AM. SOC. C. E.—Mr. President and Members of the Society, Mr. Madden and I feel greatly honored. We confess that in view of the excellence of the many papers, the award came as an agreeable surprise. I wish to thank publicly all those who helped us in the preparation of the paper, particularly Mr. Merriman and Mr. Honness. Without their encouragement and assistance, the experiments would never have been completed, nor the paper written. I thank you.

THE PRESIDENT.—The Arthur M. Wellington Prize has been awarded to J. P. Newell, M. Am. Soc. C. E., who will be presented by Mr. George C. Mason.

GEORGE C. MASON, M. AM. SOC. C. E.—Mr. President, I have the very great honor of presenting to you for the Arthur M. Wellington Prize, Joseph Pettus Newell, of Portland, Ore. Mr. Newell was born in the Oregon country and was educated at the Massachusetts Institute of Technology. He soon returned, however, to his native State, and became one of those almost legendary characters, a railway locating and constructing engineer. He pursued this vocation with conspicuous success for twenty years, and retired in 1908 to become a Consulting Engineer in Portland.

During that period, he specialized in the then somewhat new branch of engineering, the valuation of public utilities, and, as a result, in 1918, he was called by the Canadian Government to act as Engineer in presenting to an Arbitration Court the valuation of the Canadian Northern Railway which the Canadian Government had just taken over. In 1920, he was again called by the same Government in connection with similar duties with respect to the valuation of the Grand Trunk Railway. In his work on both these organizations, which were probably the most important single valuations ever undertaken, involving as they did about \$500 000 000 each, he made the studies for his paper on cost of valuation, namely, "An Analysis of the Cost of Freight Service, Grand Trunk Railway Company of Canada".

I cannot but remark, Mr. President, the appropriateness of the selection of this paper for the first award of the Wellington Prize, for it follows with remarkable exactitude the classic principles laid down in the work of that member of the Society in whose honor the prize is named. I have great honor in presenting Mr. Newell to you, Mr. President.

THE PRESIDENT.—Mr. Newell, in behalf of the American Society of Civil Engineers, I take pleasure in handing to you this engraved certificate or diploma of the award of the Arthur M. Wellington Prize, together with the \$75 in cash which accompanies the prize, for the outstanding excellence of your paper on this particular subject.

J. P. NEWELL, M. AM. SOC. C. E.—Mr. President and Gentlemen of the Society, I am deeply sensible of the honor conferred upon me, and I thank you.

THE PRESIDENT.—The next award is the Collingwood Prize for Juniors to Jacob Feld, Jun. Am. Soc. C. E., and I will request Mr. Henry Goldmark to present Mr. Feld.

HENRY GOLDMARK, M. AM. SOC. C. E.—Mr. President and Fellow Members: I appreciate highly the opportunity of taking part in a small way in this ceremony.

The Collingwood Prize for Juniors has always seemed to me of especial value as an incentive for our younger members to undertake the somewhat arduous task of presenting papers before the Society.

10 In awarding it, a high standard has been maintained. Although instituted in 1895, it has been awarded only twenty times, and the papers for which it has been given have been generally of a high grade of excellence, constituting in more than one instance a valuable contribution to engineering science.

The paper by Mr. Jacob Feld, on "Lateral Earth Pressure", to which the prize is awarded this year, is second to none of its predecessors in interest and permanent value.

The problem of earth pressure, one of the oldest to confront the constructor, has long been studied by mathematical and, to some extent, by experimental methods. Owing to the infinite variety of soil conditions, the need for a large number of careful tests, on as large a scale as possible, is especially great. Much valuable work of this kind has been done, although, unfortunately, on rather small models, but the results of many of the tests have remained buried in learned transactions and periodicals not readily accessible to the practising engineer.

Mr. Feld's paper gives a detailed account of an extended series of tests made by himself, followed by an exhaustive study of practically all previous work of the kind.

His own experiments are an advance on previous tests in being on a fairly large scale, the model wall used having been 6 ft. high and 5 ft. wide, and made with apparatus by which the active earth pressure was measured directly by means of a platform scale.

The paper is characterized especially by great clearness in exposition. It seems to me to be of exceptional value as a step toward the fuller comprehension of the classic problem of earth pressure.

It gives me much pleasure to present Mr. Jacob Feld to you for the award of the Collingwood Prize for Juniors for this year.

THE PRESIDENT.—Mr. Feld, in behalf of the American Society of Civil Engineers, I have the pleasure of presenting to you this \$50 cash prize and this engraved certificate or diploma for the excellence of your paper on "Lateral Earth Pressure: The Accurate Experimental Determination of the Lateral Earth Pressure, Together with a Résumé of Previous Experiments".

JACOB FELD, JUN. AM. SOC. C. E.—Mr. Chairman and Members of the Society, I am very grateful to the Society for the prize, and wish to thank those members who helped me in conducting the research work and writing the paper, and also those who contributed to my paper.

THE PRESIDENT.—At its meeting yesterday the Board of Direction passed a resolution addressed to the President and to Members of Congress at Washington with reference to a matter which is more or less dear to the hearts of all of us, namely, the proposed reduction in the income tax. It seems that perhaps it would be desirable to inform this Annual Meeting of what action was taken by the Board and I shall ask the Secretary to read the resolution adopted by it.

THE SECRETARY.—Mr. President, the resolution is as follows:

"Whereas, Federal Taxes as at present levied exercise a great restrictive influence on the prosperity of the country, its industries and commerce, and impose an oppressive burden on the earnings of the individual citizen; and



"Whereas, the welfare of the country, its citizens, industries and commerce, demands that the burden of taxation be lightened to the greatest possible extent consistent with governmental requirements; and

"Whereas, the Secretary of the Treasury of the United States has presented to Congress and to the people of the country a proposed tax plan, comprehensive in detail, constructive in effect, non-partisan in character, which if enacted into law will greatly decrease the individual tax burdens and stimulate the general prosperity of the country and all of its citizens by increasing the influx of capital into the streams of commerce, industry and needed public improvements; therefore,

"Be It Resolved, that the American Society of Civil Engineers, in Annual Meeting assembled, approves and endorses the Bill advocated by the Secretary of the Treasury for the revision of Income Taxes, and respectfully urges upon the Congress of the United States its immediate passage.

"Be It Further Resolved, that copies of this resolution be sent to the President of the United States, the Secretary of the Treasury, all National Engineering Societies, the Local Sections of the American Society of Civil Engineers, and such officials as the President of the Society may designate."

J. V. DAVIES, M. A. Soc. C. E.—I have great pleasure, Mr. President, in moving this resolution as the sense of this meeting.

CLEMENS HERSCHEL, PAST-PRESIDENT, A. M. Soc. C. E.—I second it.

THE PRESIDENT.—It is moved and seconded that the resolution as read be made the sense of this meeting. Are you ready for the vote? Those in favor manifest it by saying "aye"; contrary, "no." It is carried unanimously.

Have you any other announcements, Mr. Secretary?

THE SECRETARY.—A telegram has just been received from the Chairman of the Local Committee on Arrangements for the Spring Meeting to be held in Atlanta, Ga., in April, who has recently been elected President of the Atlanta Chamber of Commerce, in which he assures us that the keys of the City of Atlanta will be turned over to the Society for this occasion. His telegram reads as follows:

"ATLANTA, GA., 944A Jan. 16, 1924

"JOHN H. DUNLAP,

"Secy., AMERICAN SOCIETY OF CIVIL ENGRS.,

33 West 39 St., New York, N. Y.

"Please extend to the Board of Directors our congratulations on selecting Atlanta for the Spring Convention. We look forward with keen pleasure to the coming of the American Society of Civil Engineers to Atlanta and will do all in our power to make your visit pleasant and interesting. We hope you will come in large numbers.

"PAUL H. NORCROSS,

"President, Atlanta Chamber of Commerce".

(The Secretary made several other announcements.)

THE PRESIDENT.—Is there any new business, Mr. Secretary?

THE SECRETARY.—Not at this time.

THE PRESIDENT.—Has any other member of the Society any business to present at this time? If not, then we have come to the last phase of the business of this interesting meeting, the report of the Tellers on the canvass of the ballot for officers for the ensuing year.

W. F. REEVES, M. AM. SOC. C. E.—As Chairman of the Tellers appointed to canvass the ballot for officers of the Society for 1924, I beg to submit the report as follows:

"33 West 39th Street, New York, N. Y.

"January 16, 1924.

**"TO THE SEVENTY-FIRST ANNUAL MEETING**

**AMERICAN SOCIETY OF CIVIL ENGINEERS:**

"The Tellers appointed to canvass the ballots for Officers of the Society for 1924, report as follows:

"Total number of ballots received..... 2 674

"Deduct

Ballots from members in arrears of dues..... 12

" from non-corporate members..... 0

" unsigned ..... 20

" signatures printed..... 3

" signatures indecipherable..... 0

"Total number not entitled to vote..... 35

"Ballots canvassed..... 2 639

" void ..... 9

" counted ..... 2 630

**"For President:**

CARL EWALD GRUNSKY..... 2 603

Scattering ..... 23

**"For Vice-Presidents:**

LINCOLN BUSH..... 2 507

OSCAR SIDNEY BOWEN..... 2 502

Scattering ..... 8

**"For Directors:**

District No. 1 { PAUL GOODWIN BROWN..... 2 466

{ THADDEUS MERRIMAN..... 2 488

{ Scattering ..... 6

District No. 4 { ROBERT FARNHAM..... 2 469

{ Scattering ..... 2

District No. 11 { ARTHUR OSBOURNE RIDGWAY..... 2 471

{ Scattering ..... 0

District No. 14 { ALEXANDER MAITLAND, JR..... 2 468

{ Scattering ..... 7

District No. 15 { JOSEPH MILAN HOWE..... 2 469

{ Scattering ..... 1

"W. F. REEVES, *Chairman,*

"W. J. BOUCHER,

WILLIAM W. BRUSH,

OTTO G. H. BUETTNER,

CLINTON H. CROOKS,

ERNEST B. DAY,

M. H. FREEMAN,

C. F. GARDNER,

ALGER C. GILDERSLEEVE,

E. G. HAINES,

H. P. HAMMOND,

SHORTBRIDGE HARDESTY,

HERBERT C. KEITH,

HAROLD M. LEWIS,

E. W. MALONEY,

W. C. MERRYMAN,

WALTER L. MORSE,

E. R. NEEDLES,

R. SPEIRS SAUNDERS,

J. B. SNOW,

WALTER E. SPEAR,

D. C. WAITE,

HARRY D. WINSOR,

FRANCIS H. WRIGHT,

*"Tellers."*

(The President announced the names of the successful candidates.)

**THE PRESIDENT.**—The Constitution of this Society does not require any address from the retiring President. Neither has it been customary that there should be one; and I am only going to say at this time that it has been the greatest pleasure of my life to have been of service to my fellow engineers and to this Society, of which I have been a member for so many years with so much of pleasure and satisfaction to myself. I thank you, Gentlemen.

Mr. Grunsky, you have been elected by the members of the American Society of Civil Engineers to be its President for the ensuing year. It is my privilege and my honor to present to you this symbol of office. I trust, sir, that you may have as much pleasure and joy and satisfaction in the service as I have had.

**Members of the American Society of Civil Engineers, Mr. Grunsky, President of the Society.**

**C. E. GRUNSKY, PRESIDENT, AM. SOC. C. E.**—Mr. Retiring President and Members of the Society, in accepting this high honor, of which I am deeply appreciative, I am mindful of the responsibility imposed on your President and on your Board of Direction, and would remind the membership that the successful conduct of the affairs and activities of this Society, as is true of all similar organizations, depends on the harmonious relations between those placed in authority and the active members. I bespeak, therefore, a continuance of the cordial relations which have been so intimate and which have been maintained so successfully in the past, and need not remind you that our success as a profession depends on the high ideals which, as engineers and citizens, we have made our own.

As members of this Society you must not forget that the Profession of Civil Engineering extends beyond our membership. Not all civil engineers are members of the Society. Furthermore, although Civil Engineering as a profession can hardly claim to be more than 150 years old, its field has already become so broad and so diversified that separation into branches is going on apace. When we talk of Civil Engineers, it is one thing. When we talk of the Society, it is quite another. We count in our profession Electrical, Mechanical, and Mining Engineers, and many others whose specialized activities have placed them somewhat apart from the members of our own organization of broader scope. We would like to make them all members of this Society, but we know that, although desirable in a broad sense, this is too much to expect.

Nevertheless, there are common aspirations and common interests. The proper relation of the entire profession to the public must be maintained. This can only be satisfactorily done by close co-operation. An intimate contact between the Founder Societies must be fostered, and as far as practicable they should be in accord on matters of common concern. This applies also to the relation which should be maintained with similar engineering organizations abroad. The more intimate our contact, the more useful we shall make the engineer in the affairs of the world.

I am mindful of the fact, however, that I would be violating a tradition if I should at this time extend my remarks. We are proud of the record which

has been made by those who have guided the destiny of the Society in the past and pledge ourselves to endeavor to live up to that record. May the Society continue to flourish with ever increasing usefulness to our country and to mankind. I thank you.

Mr. Secretary, are there any further announcements?

(The Secretary presented announcements relative to the excursions, etc.)

THE PRESIDENT.—Are there any other announcements to be made from the floor, or has any member anything further to offer. If not, this meeting will now stand adjourned until 2:30 P. M.

#### Afternoon Session

Wednesday, January 16, 1924.—The meeting was called to order in the Auditorium of the Engineering Societies Building, New York, N. Y., at 2:30 P. M.; President C. E. Grunsky in the chair; John H. Dunlap, Secretary; and present, also, about 215 members and guests.

THE PRESIDENT.—The hour set for this session has arrived, and the meeting, therefore, is called to order.

The Board of Direction has passed a resolution relating to the work of the Sanitary Engineers, which I shall ask the Secretary to read.

THE SECRETARY.—This resolution is presented for adoption by the Society, as follows:

"Whereas, the work of sanitary engineers is essential to the protection and promotion of the Public Health; and

"Whereas, the sanitary engineers in the United States Public Health Service are not now commissioned officers; and

"Whereas, the commissioning of such sanitary engineers would improve the service and thereby benefit the public; and

"Whereas, a bill entitled 'A Bill to Promote the Efficiency of the United States Public Health Service' has been prepared by the United States Treasury Department, which, in providing for the improvement of the service, authorizes the commissioning of sanitary engineers as well as other scientific personnel in the United States Public Health Service; and

"Whereas, this bill was unanimously approved at a joint meeting by committees of the American Society of Civil Engineers, the American Public Health Association and the Federated American Engineering Societies; therefore, be it

"Resolved, That the American Society of Civil Engineers in convention assembled endorses this bill as a first step in the advancement of the status of sanitary engineering in the United States Public Health Service; and be it further

"Resolved, That a copy of this resolution be sent to the President of the United States, to the Secretary of the Treasury, and the Committees of the Senate and the House to which this bill is referred."

THE PRESIDENT.—What is your pleasure, Gentlemen?

GEORGE W. FULLER, M. AM. Soc. C. E.—I move the adoption of this resolution.

(Motion seconded.)

THE PRESIDENT.—It has been moved and seconded that this resolution be adopted. Are you ready for the question? All those in favor of the motion signify by saying "aye"; contrary, "no". The resolution is adopted.



We are to receive the reports of the Special Committees this afternoon, and unless a motion to the contrary is made, it will be understood by the Chair that all reports of Committees are received and referred to the Board of Direction with power. The first Committee to report is the Special Committee on Impact in Highway Bridges, Professor Almon H. Fuller, Chairman. Vice-President Marston will present the report.

ANSON MARSTON, M. AM. SOC. C. E.—Professor Fuller, who is unable to be present at the meeting, requested that I should read his report, which this year is quite brief.

(Professor Marston presented the Progress Report of the Committee.\*)

THE PRESIDENT.—I shall now call for the report of the Special Committee on Stresses in Structural Steel. The report will be presented by Professor F. O. Dufour, Chairman of the Committee.

F. O. DUFOUR, M. AM. SOC. C. E.—Mr. President, the following progress report of the Special Committee on Stresses in Structural Steel, is submitted.

(Professor Dufour presented the Progress Report of the Committee.†)

PROFESSOR DUFOUR.—Since this report was sent in, a committee meeting was held in Pittsburgh, Pa., of the representatives of the American Society for Testing Materials and the American Railway Engineering Association, at which the American Society of Civil Engineers and the American Steel Manufacturers Association were unofficially represented. All these representatives agreed to recommend to their respective associations that the specification for the mill yield point should be at least 50% of the ultimate strength, but not less than 30 000 lb. per sq. in., and that this should refer only to structural steel rolled for bridges and for buildings.

THE PRESIDENT.—This report shows valuable progress, and the recommendation as to the desirability of agreement in specifications that has been made by the Committee will be given careful consideration by the Board of Direction.

I shall now call for the report of the Special Committee on Fire Prevention of Docks, Piers, and Wharves. In the absence of the Chairman, Mr. Benjamin Thompson I shall ask Mr. Rudolph P. Miller to present the report.‡

RUDOLPH P. MILLER, M. AM. SOC. C. E.—Mr. President and Gentlemen, this Committee was appointed by the Society to co-operate with a committee of the National Fire Protection Association on the subject of the protection of docks, wharves and piers against fire. The Association appointed its Committee in 1919, and in June, 1921, that Committee made a report and recommended a number of regulations as suitable for the construction of docks, piers, and wharves. The National Fire Protection Association, however, desired to have the co-operation of other organizations and invited, together with the American Society of Civil Engineers, four other organizations, the American Institute of Marine Engineers, the Association of Port Authorities,

\* See p. 260.

† See p. 263.

‡ See p. 272.

the Railway Fireproofing Association, and the Association of Terminal Engineers, to discuss this report.

Unfortunately, the work of your Committee was interrupted about a year ago by the death of its former Chairman, Frank W. Hodgdon, of Boston, Mass., and the report was delayed. The Committee took up the report as tentatively adopted by the National Fire Protection Association and devoted its entire time to criticism of it and suggested amendments.

This report is intended to be a series of regulations regarding the construction of docks, wharves, and piers. Your Committee, however, found that incorporated in it was much that is not properly regulatory, but simply explanatory, and one of the suggestions made by the Committee was that those matters, including the introduction, the fire record, the general statement of the conditions and requirements that must be considered, and a discussion of concrete for use in sea water, should be separated from the regulations and published as explanatory or introductory to them. The regulations themselves the Committee has generally endorsed.

A number of changes have been suggested by way of simplification of requirements and clarification. The regulations, therefore, as suggested by your Committee, will consist, in the First Section, of the nomenclature; in the Second Section, of the general administration of docks, piers, and wharves, discussing the extent to which they may be undivided and the heights to which they should be limited; the Third, Fourth, and Fifth Sections will be devoted to the construction of the wharves, the Third to the construction of fire-resistive wharves; the Fourth to non-fire-resistive wharves; and the Fifth to the treatment of existing wharves to make them as fire resistive as possible.

Following that, there is a section of miscellaneous requirements and another on fire protection generally, the latter covering those requirements dealing with sprinkler equipment, stand-pipe equipment, and other fire-fighting appliances, watchmen's services, etc. It would take too much time to go into detail as to any of these particular requirements. It is assumed that the report of the Committee will be published and submitted for discussion.

In its instructions, when it was organized, the Committee was told that the scope of the objects of the Society did not contemplate the matter of fire protection. The Committee feels, however, that this Society ought to be vitally interested in fire protection generally, and recommends the appointment of a committee the field of activity of which shall cover all structures similar in character and use to buildings as ordinarily understood, including all those features in buildings intended to resist fire and the frequency of fires. It also recommends that the committee co-operate with other committees on the same subject.

THE PRESIDENT.—Thank you, Mr. Miller. This recommendation of the Committee, too, will be given careful consideration by the Board of Direction.

We will now receive the report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, etc., Mr. Robert A. Cummings, Chairman. I shall ask the Secretary to give us the substance of the report.

THE SECRETARY.—Mr. Cummings reports that the condition of his health will not permit him to return from Bermuda to New York for the Annual Meeting. His report is as follows:

PROGRESS REPORT OF  
SPECIAL COMMITTEE TO CODIFY PRESENT PRACTICE ON THE BEARING VALUE OF  
SOILS FOR FOUNDATIONS, ETC.

"TO THE MEMBERS

AMERICAN SOCIETY OF CIVIL ENGINEERS:

"Your Special Committee appointed to investigate the relation of soils to engineering structures has been engaged during the past year in a further study of the available data on colloidal clays.

"The associated investigation of U. S. Bureau of Public Roads, Mr. T. H. Macdonald, Chief, and Iowa State College, Dean Anson Marston, Director, and others have made notable progress.

"It is hoped that results will be available shortly. In the meantime, your Committee has under consideration the relation of colloidal content of clay in its practical applications. The subject has not yet been developed sufficiently to present final results.

"Your Committee acknowledges with much appreciation assistance tendered by Mr. Herbert Chatley and Mr. William H. Pahl.

"With your consent, the Committee will continue its work.

"Respectfully submitted,

"ROBERT A. CUMMINGS, *Chairman.*"

THE PRESIDENT.—I will now ask for the report of the Special Committee on Stresses in Railroad Track, A. N. Talbot, Chairman.

A. N. TALBOT, PAST-PRESIDENT, AM. SOC. C. E.—I will read the report.

(Past-President Talbot presented the Progress Report of the Committee.\*)

THE PRESIDENT.—Thank you, Professor Talbot. We will now receive a report from the Special Committee on Highway Engineering, Mr. H. Eltinge Breed, Chairman.

THE SECRETARY.—Mr. President, Mr. Breed is unable to be present due to illness. The report of the Committee is as follows:

PROGRESS REPORT OF  
SPECIAL COMMITTEE ON HIGHWAY ENGINEERING

"The Committee on Highway Engineering begs to report that it has been inactive during the year. Created four years ago to keep in touch with Federal Aid Work, it has watched that work through its initial stages to the point where, if the present policy is continued, there is visible ahead only orderly and satisfactory progress with given methods toward definite aims.

"As there has seemed this year to be no especial work for this Committee, and as whatever its function might be would now naturally be included in the happily established Highway Division of the Society, I am glad to present for your consideration the recommendation of two members of the Committee, Mr. Austin B. Fletcher and Mr. John M. Goodell, that the Committee be dismissed.

"Respectfully submitted,

"H. ELTINGE BREED, *Chairman.*"

THE PRESIDENT.—I now call for the report of the Special Committee on Bridge Design and Construction, Mr. Henry B. Seaman, Chairman.

HENRY B. SEAMAN, M. AM. SOC. C. E.—The Committee merely reports progress, as follows:

PROGRESS REPORT OF  
SPECIAL COMMITTEE TO CONSIDER AND RECOMMEND FOR ADOPTION A SPECIFICATION  
FOR BRIDGE DESIGN AND CONSTRUCTION

“TO THE PRESIDENT AND BOARD OF DIRECTION,  
AMERICAN SOCIETY OF CIVIL ENGINEERS:

“The Special Committee on Specifications for Bridge Design and Construction has held two meetings since its report of November 17, 1922, and has presented for discussion, at a meeting of the Society, November 7, 1923, a Tentative Specification for the design and Construction of Steel Highway Bridges.

“These highway bridge specifications follow in general outline those which have already been presented for railroad bridges, with such modifications as the different conditions necessitate. The fact that the experience and practice of the manufacturers of railroad bridges differ from that of highway bridge builders may require still further provisions to meet the latter conditions.

“Much attention has been given to the selection of the proper loading and this is not merely a physical condition but an economic and a psychological condition as well. The tendency of legislation is toward the restriction of heavy loads, but the Committee believes that it must have economic foresight as to the future possibilities, or even probabilities, while at the same time conforming to public requirements. A permanent bridge should be designed for indefinite life.

“The next meeting of the Committee will be called as soon as all discussions are received and tabulated, and it is believed that the coming year will see the completion of our work on steel highway bridges.

“Respectfully submitted,

“(Signed) HENRY B. SEAMAN, *Chairman.*”

THE PRESIDENT.—I will now call for the report of the Special Committee on Irrigation Hydraulics, Mr. D. C. Henny, Chairman. Mr. Henny has sent in a report which I will ask the Secretary to read.

(The Secretary read the Progress Report of the Special Committee on Irrigation Hydraulics.\*)

THE PRESIDENT.—I now call for the report of the Special Committee on Hydraulics Phenomena, Professor S. M. Woodward, Chairman.

S. M. WOODWARD, M. AM. SOC. C. E.—Mr. President and Gentlemen, the report of progress of the Special Committee on Hydraulics Phenomena is as follows:

PROGRESS REPORT OF  
SPECIAL COMMITTEE ON HYDRAULICS PHENOMENA

“The Special Committee on Hydraulics Phenomena was appointed by President Charles F. Loweth in May, 1923. The Committee has held one meeting at Ithaca, N. Y., in September, 1923, at which its organization was completed by the election of M. L. Enger, M. Am. Soc. C. E., as Secretary.



"The Committee is endeavoring at present to secure by correspondence as complete information as possible concerning the status of research in hydraulics phenomena in the United States. Information is being sought as to researches now under way, researches that have been begun, but on which work has been suspended before completion, and researches which have been completed, the results of which have either been published or remain unpublished.

"The Committee has also begun the preparation of complete and annotated bibliographies on certain fundamental topics in hydraulics.

"It hopes to make sufficient progress during 1924 to be able to prepare a complete report on some of these matters.

"The Committee will welcome suggestions from all interested engineers as to what it ought to undertake in order that its work may be of most use to the profession.

"S. M. WOODWARD, *Chairman.*"

THE PRESIDENT.—I shall ask Mr. J. S. Langthorn, Chairman of the Special Committee on Standard Construction Contracts, to present the report of that Committee.

J. S. LANGTHORN, M. AM. SOC. C. E.—Mr. President and Gentlemen, the report is as follows:

#### PROGRESS REPORT OF

#### SPECIAL COMMITTEE ON STANDARD CONSTRUCTION CONTRACTS

"TO THE BOARD OF DIRECTION

AMERICAN SOCIETY OF CIVIL ENGINEERS.

"GENTLEMEN.—Your Committee can report very substantial progress for the past year.

"Two second tentative drafts of Standard Construction Contracts, including general conditions and special conditions have been prepared: One for the construction of buildings; and one for railroad work.

"These tentative drafts have been studied by the different elements in the Joint Conference on Standard Construction Contracts, with which your Committee has been operating, and revisions are under way.

"Your Committee has submitted the second tentative drafts to each Local Section of the Society, and has received many valuable criticisms, and extra copies have been placed in the Secretary's office.

"It is proposed to print the next draft in the *Proceedings* of the Society, so that your Committee may receive the criticisms of those members of the Society who are interested in this subject.

"The Joint Conference on Standard Construction Contracts is composed of the following bodies: American Association of State Highway Officials, American Institute of Architects, American Railway Engineering Association, American Society of Civil Engineers, American Water Works Association, Associated General Contractors of America, Federated American Engineering Societies, National Association of Builders' Exchanges, and Western Society of Engineers.

"Respectfully submitted,

"J. S. LANGTHORN, *Chairman.*"

MR. LANGTHORN.—Mr. President, I move that this report be received.

THE PRESIDENT.—It will be received automatically under the announcement that was made at the commencement of this meeting and will be given careful consideration by the Board of Direction. I thank you, Mr. Langthorn.

I shall now ask Mr. N. C. Grover, Chairman of the Special Committee on Flood Protection Data, to present the report of that Committee.

N. C. GROVER, M. Am. Soc. C. E.—The report is as follows:

PROGRESS REPORT OF  
SPECIAL COMMITTEE ON FLOOD PROTECTION DATA

"The principal accomplishments of the Committee during the year have been the design, trial, adoption, and printing of forms for compiling flood data. The field of work of the Committee is so large and the data relating to floods are so voluminous that the design of the forms has been difficult because of the necessity for restricting the work to the possibilities of accomplishment by the Committee without undue expense to the Society.

"One meeting has been held during the year, at which considerable progress was made. Otherwise, the work of the Committee has been done by correspondence. The forms having been adopted and printed, the Committee is now engaged in compiling data, but the compilations have not progressed sufficiently to warrant presentation for discussion.

"N. C. GROVER, *Chairman.*"

MR. GROVER.—I wish to add to this report the statement that the Committee would be glad to have the assistance of other engineers who are familiar with floods and flood data, and I should be glad to furnish any engineer with copies of the forms for use in assisting the Committee.

THE PRESIDENT.—There are still other Committee reports due and I am sure that the members of these various Committees will be glad to give information in addition to that which is presented in the reports. I wonder if we might hear from Mr. Freeman on the subject of fire prevention, either as confined to docks, piers, and wharves, or in general?

JOHN R. FREEMAN, PAST-PRESIDENT, AM. SOC. C. E.—Mr. President, I would rather be excused. I am not expecting to speak at this time. If you want my review later, I shall be very glad to give it.

THE PRESIDENT.—May we hear from any one else on any subject that has been presented?

PROFESSOR MARSTON.—The experiments mentioned by Mr. Cummings in the progress report of the Special Committee on Soils for Foundations, and under way, were undertaken three years ago largely on the initiative of the Society which that year contributed \$1000 for co-operative work in this line. The experiments were continued during the summer seasons of 1922 and 1923 under a co-operative arrangement between the U. S. Bureau of Public Roads and the Iowa Engineering Experiment Station, which bore the expense equally.

The results have been made available for the Special Committee on Soils from time to time. As planned, the work is being conducted on a special tract of land set aside for that purpose at Iowa State College at Ames, Iowa. It is believed that the work of the first three seasons has resulted in the accumulation of empirical data sufficient to warrant their publication in bulletin form during the season of 1924. The work, on which about six or eight men are employed each summer for a period of two to three months, however, will continue for an indefinite number of years.

A definite technique has been developed for obtaining the engineering constants for any particular type of soil which is believed will be of use to the engineer. The experiments are made largely on soil in its natural state. At present, experiments are being made on top, sandy, loam soil, a yellow clay subsoil, and underneath a very solid blue-clay subsoil.

For each of these soils a complete chemical, mineral, and mechanical analysis, is made. The mechanical analysis is extended to the determination of the colloidal matter in the soil. The methods used in the determination of colloidal matter are substantially those developed by the U. S. Department of Agriculture in the Bureau of Soils and in the Bureau of Public Roads.

In addition to the mechanical analysis, the weight per cubic foot of soil in place, together with the specific gravity of particular particles is determined. From these two determinations the porosity of the soil can be calculated. The percentage of moisture as well as the capacity of the soil to transmit water under definite head and the hydraulic constant, are also determined, which will show the capacity of various soils to transmit water under different heads; and it is also found that it is the characteristic law that the flow of water through a sample of soil as found in a field increases faster than the head, which struck me as being an unusual phenomenon at the time it was first called to my attention.

The compressive strength of the soil as well as the tensile strength, the shearing strength, and the coefficient of internal friction, have been determined by laboratory tests. The strength of the soil to carry foundation loads has also been determined by reading the upper surface of horizontal strata over various areas and in various amounts, and a study is being made of the time effect and load effect on the total deformation of soil and of strata of soil as operating load on the upper surface.

The investigations are directed toward determining the percentage of colloidal matter to these engineering constants and overcoming the effect of colloidal matter in determining muds. If the soil could be submitted to a temperature sufficiently high, the mud-producing problems could be eliminated. That is what is done when brick is burned.

Various other methods are also being tried, such as chemical methods and the washing out of the colloidal matter. We are also attempting to determine the electric resistance of soil for the purpose of the grounding of electric wires.

THE PRESIDENT.—The Secretary will now present the report of the Special Committee on Concrete and Reinforced Concrete Arches, Mr. C. T. Morris, Chairman.

(The Secretary presented the Progress Report of the Committee.\*)

THE PRESIDENT.—The report of the Committee is full of promise. It is doing good work. I shall ask Mr. George Gibbs to present the report of the Special Committee on the Electrification of Steam Railways, Mr. Charles F. Loweth, Chairman.

(George Gibbs, M. Am. Soc. C. E., reported that it has been impossible for the Committee to prepare a formal report, for presentation at the Annual Meeting,

\* See p. 290.

but that the Committee intends to prepare a report for the next Annual Meeting. The Committee wishes to be continued. Mr. Gibbs followed this statement with some informal remarks in explanation of the work of the Committee.)

THE PRESIDENT.—I shall ask Mr. S. H. Widdicombe, a member of the Committee, for the report of the Special Committee on Steel Column Research.

S. H. WIDDICOMBE, M. A. M. Soc. C. E.—Mr. President, the following is the progress report of the Committee on Steel Column Research:

#### PROGRESS REPORT OF

#### SPECIAL COMMITTEE ON STEEL COLUMN RESEARCH

"The Special Committee on Steel Column Research begs to submit the following Progress Report:

"The Committee was appointed during the summer of 1923, and consists of Messrs. Carl G. E. Larsson, B. R. Leffler, G. L. Taylor, Stacey H. Widdicombe, and the undersigned as Chairman.

"After considerable delay, due to other engagements, especially of the Chairman, during September and October, the Committee got together for its initial meeting on October 29, 1923. At this meeting, all members were present except Mr. Widdicombe.

"Mr. Alfred D. Flinn, Director of Engineering Foundation, was invited to be present, and sat with the Committee during a considerable part of the discussion. Most of the time was spent by the Committee in a review of the general status of column research at the present time, in order to assist in formulating plans for the future, especially with reference to the question whether or not a testing program should be taken up immediately. It was the unanimous opinion of the Committee that the results of past experiments were not yet sufficiently digested and studied, and that before additional tests were started, a further study of existing data should be made. It was, furthermore, the belief of the Committee that to enable such a study to be made by the Committee, a very considerable amount of work was required in getting material compiled, reduced, classified, and put into such shape that the members of the Committee could use it effectively. It was also agreed that the best and most efficient method of acquiring such a digest was to employ one or more trained assistants having access to libraries and other sources of information, who should work under the direction of the Chairman. Pursuant to this conclusion, the Chairman of the Committee was authorized, subject to the approval of the Board of Direction, to employ such assistants and to proceed with this work, with a view to getting material in form for the use of the Committee some time during 1924.

"It was the belief of the Committee that such a study would yield profitable results, and would assist greatly in the formulation of a future program, in fact, until such a study is made, it does not seem wise to undertake a testing program or to decide whether or not a testing program should be undertaken.

"F. E. TURNEAURE, *Chairman.*"

THE PRESIDENT.—Thank you, Mr. Widdicombe. I think it would be very informative if we had from Professor Talbot a statement of the relations of the Standing Committee on Research to the various Special Committees the reports of which we have just heard read. May we ask for such a statement, Professor Talbot?



PROFESSOR TALBOT.—The Committee on Research was formed two years ago to consider and deal with matters of research which may be taken up by the Society. At the beginning, the principal purpose of the Committee was to consider whether it was desirable and wise to form a research committee to consider a given subject, to discuss the nature of the work and the need for funds, to report on what chances for obtaining results might be expected, and, if appointed, to outline what the field of the committee should be.

Further, the action of the Board of Direction provided that the duties of the Committee on Research should be to organize, stimulate, and supervise the research work of the Society as conducted by its committees or through co-operation with societies and individuals. The Committee, therefore, has tried to keep in touch with the work of the research committees and to help in some way in their work.

From the beginning, too, the members of the Committee on Research has had in mind bringing to the attention of the Society the need of research in civil engineering in the various fields and endeavoring to stimulate research in various channels outside of committee work. It has been thought that the outlining of the need of research and the opportunities for getting information in various lines of value to the profession, even the naming of problems to various agencies, such as the laboratories of colleges and corporations and public works, would result in an expansion of research work and a gathering of valuable information that would add to the science and art of engineering.

The functions of the Committee on Research are described in a report in a brief paper on "The Research Activities of the American Society of Civil Engineers," recently published by the Society.\*

THE PRESIDENT.—Is there any other matter to come before the meeting relating to the reports of the Special Committees? If not, I shall ask the Secretary whether he has any announcements to make.

(The Secretary made announcements relative to arrangements for the entertainments, meetings, etc.)

THE PRESIDENT.—Is there any other business to come before this meeting? If not, this Annual Meeting of the American Society of Civil Engineers will stand adjourned.

Thursday, January 17, 1924.—The meeting was called to order at 8:15 P. M.; Past-President, Charles F. Loweth in the chair; and present, also, about 585 members and guests.

Past-President Loweth introduced the speaker of the evening, Dr. Charles P. Berkey, Professor of Geology of Columbia University, who addressed the meeting on "Explorations in the Desert Regions of Central Asia".

At the close of the meeting, Past-President Loweth on behalf of the Society thanked Dr. Berkey for his interesting address.

Following the address by Dr. Berkey, motion pictures were shown of the Jamaica Causeway, a viaduct being constructed across Jamaica Bay to connect Rockaway with the Borough of Queens, New York.

\* *Transactions, Am. Soc. C. E.*, Vol. LXXXVI (1923), p. 1283.

**February 6, 1924.**—The meeting was called to order at 8:05 p. m.; Vice-President Lincoln Bush in the chair; John H. Dunlap, Secretary; and present, also, 43 members and guests.

The minutes of the Fall Meeting, October 17 and 18, 1923, and of the meeting of November 7, 1923, of the Society, were approved as printed in *Proceedings* for December, 1923.

A paper by J. Charles Rathbun, M. Am. Soc. C. E., entitled "The Analysis of Stresses in the Ring of a Concrete Skew Arch", was presented by the author and illustrated with lantern slides. Written discussions on the paper by Messrs. A. H. Fuller and Edward Godfrey were read by the Secretary, and the subject was discussed by Messrs. A. H. Beyer, A. G. Hayden, and the author.

Adjourned.

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### OF THE BOARD OF DIRECTION

This is an abstract of the notes of the Secretary and subject to approval  
by the Board of Direction at its next meeting.

**January 14, 1924.**—The Board met at 10:00 a. m., at Society Headquarters; President Charles F. Loweth in the chair; John H. Dunlap, Secretary; and present also Messrs. Begien, Brown, (came in at 10:20 a. m.) Chester, Condron, Darrow, Davison, Dyer, Fenkell, Freeman, Grunsky, Hogan, Holmes, Huber, Humphrey, McConnell, Marston, (came in at 10:45 a. m.) Mason, Ridgway, Talbot, Webster, Whitman, Winsor, Yates, and Treasurer Hovey.

#### RESOLUTIONS ON THE DEATH OF DIRECTOR ANDERSON

A moment of silence was observed while the members of the Board stood in respect to the memory of Director George G. Anderson, who died on December 23, 1923.

On motion, President Loweth appointed Messrs. Grunsky, Humphrey, and Ridgway as a Committee to draft a resolution of sympathy. The Committee subsequently presented the following resolution which was unanimously adopted by a rising vote:

"In the passing of George G. Anderson the Engineering Profession has lost a distinguished member. His whole soul was in every task that he undertook. During his three years of service on this Board there was no one more dependable than he. Those who have been privileged to work with him knew his worth. He was beloved by all who came in contact with him for his genuine and genial qualities. His kindly sympathy and aid went out to those in distress. In this connection his effort to have a Benevolent Fund established will be recalled. His going has left a void which cannot be filled.

"*Resolved*, That this tribute to his memory be spread upon the Minutes of this Board and that a copy thereof be transmitted to his family."

The President was also authorized to appoint a committee to prepare the memoir of Director Anderson for publication by the Society.

## ANNUAL REPORT

The Chairmen of the Standing Committees of the Board were appointed as a Committee to prepare the Annual Report of the Board of Direction for 1923, copies of which were distributed. The Secretary reported certain necessary corrections. After some alterations, on motion, the report was adopted.

## RECOMMENDATIONS APPROVED

On motion, the recommendation of the Executive Committee of December 12, 1923, that the item of \$1200 loaned in 1917 to the Alfred Noble Memorial Committee be remitted, was adopted; and on motion, the formation of a Joint Conference Committee, consisting of the Presidents and Secretaries of the four Founder Societies, as recommended by the Committee on Co-operation, was approved.

## MEMBERSHIP BALLOT

The President appointed Tellers to canvass the Membership Ballot. The Tellers subsequently reported and the President declared the election of 8 Members, 35 Associate Members, 1 Affiliate, and 18 Juniors, and the transfer of 19 Associate Members, and 1 Affiliate to the grade of Member, and 4 Juniors to the grade of Associate Member.

## FEDERAL RE-ORGANIZATION

The President announced that Gen. Lansing H. Beach, Chief of Engineers, U. S. A., M. Am. Soc. C. E., would like an opportunity to appear before the Board and present his case in the matter of the proposed re-organization of Government Departments. On motion, Gen. Beach was invited to address the Board. He expressed appreciation for the hearing and left the following letter addressed to the President and the Board of Direction, concerning the proposed creation of a Department of Public Works:

"War Department  
Office of the Chief of Engineers  
Washington

"January 12, 1924.

"THE PRESIDENT AND BOARD OF DIRECTION  
OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

"GENTLEMEN.—I desire to submit the following statement concerning the proposed creation of a Department of Public Works.

"The argument that the co-ordination and centralization of all engineering and construction activities in a new Department will effect greater economy and efficiency is apparently based on a misconception of the various engineering activities of the different departments. Little consideration has been given to the magnitude and diversity of the governmental activities concerned, and the controlling reasons for the establishment of the different departments and bureaus of the Government have been ignored. All these agencies have been created to accomplish certain functions, and although practically every department and almost every bureau of the Government engages at times in engineering activities or does construction work, yet these works are invariably incident to the primary functions of these various agencies.

"Engineering is a means to an end, and is, in most cases, merely one of the various instruments in the hands of the head of a department by which his

mission as a whole is carried out. To remove from the direct control of the head of a department any one of these various instruments prevents him from carrying out his complete mission on his own responsibility, and divides the accomplishment of the work which his department is intended to do between two or more independent heads. The tendency would be to consider all questions from an engineering standpoint alone, and not from the broader viewpoint.

"A single example of the fundamental error of the proponents of the Department of Public Works from this aspect will suffice. The Indian Service performs the functions of guardian and trustee for Indians, and thus administers property worth hundreds of millions of dollars. In doing this, the Indian Service requires various professional men, such as lawyers, engineers, teachers, doctors, and ministers of the Gospel. It is plain that efficiency would not be promoted if all the legal work of this service were entrusted to the Department of Justice, and all of its lawyers placed therein; its engineering work given to the proposed Department of Public Works; its teachers placed in the Bureau of Education; its doctors in the Public Health Service, and its ministers in the Chaplain's Corps. All the work done by these professional men must be devoted toward one end, that directed by one head, irrespective of the variety of their duties. In following out the argument of those who advocate a Department of Public Works, they would, however, be distributed among the other bureaus of the Government where work similar to that of each of them is done.

"In fact, these advocates of a Public Works Department are preparing to make public construction a glorified governmental function in itself rather than to have such engineering and construction work occupy their positions of proper subordination to the primary functions of Government properly delegated to different departments and bureaus.

"As will be brought out later in this communication, the charge that there are duplications in the engineering work in various departments, while it may be true in certain isolated instances, is in error in the large majority of cases, and the establishment of a separate department would not remedy the matter; for, as a matter of fact, these various different types of engineering would have to be carried on under the new department as separate entities, practically as they are at present under different departments. This fact seems to have been recognized by the proponents of a former bill for this purpose, since in the referendum sent out by the Chamber of Commerce of the United States of America under date of March 30, 1920, on the subject of the advisability of establishing a Department of Public Works, it is stated in the argument in favor of the bill, 'Finally it is to be recalled that the proposal for a new department does not contemplate disruption of the governmental agencies which would be placed under its jurisdiction. It is a matter merely of bringing the related services under one head. It is not suggested there should be consolidations. Consequently, existing working organizations will not be disturbed upon the set-up of a Department of Public Works, but all questions of redistribution of duties and the like would remain for decision in the light of subsequent experience and investigation.'

"The claims for economy made by the proponents of the bill, so far as engineering and construction work now carried on under our direction is concerned, cannot stand under a careful investigation. The cost of the Army in time of peace is a substantial fraction of the total expenditures of the Government, and one of the strongest objections of our people to a large standing Army is its high cost to the tax-payers of the country. It has, therefore, very properly been the constant effort of Congress to reduce this cost to a minimum, and in order to do so it has been proposed at various times in the past, to utilize the military forces a part of the time in the prosecution of public works, such as road-building, forestry service, construction of public build-



ings, etc., thereby making our Army partially self-supporting. The only part of our forces which is, or ever has been, regularly used in the peace-time prosecution of civil works, is the commissioned personnel of the Corps of Engineers. If the new department is established as contemplated, it would be extremely difficult to justify the maintenance of a considerable number of engineer officers not required for the command of troops, or for the execution of fortification work, if they were not engaged on work useful to the public. It will be shown below that the scheme for detailing engineer officers on temporary duty in the new department is illogical, unsatisfactory, and would soon fall into disuse. The development of the policy laid down in the bill would be the eventual reduction in the strength of the Corps of Engineers to that necessary for their routine military duties in time of peace, and with a consequent elimination of the reserve of regular engineer officers which was of such value in the emergency just past.

"It is essential that there be an Engineer Service in the Army, whether or not its duties include civil work. That military engineers are as competent and as well qualified as civil engineers to handle river and harbor work efficiently and economically, has been clearly demonstrated in the past. Their salaries are the same on civil work as on military work, and it is a well-known fact that the pay and emoluments of civil engineers engaged in private or corporate work, who have the requisite capacity for administering the higher duties mentioned in this bill, are far in excess of any salaries authorized to be paid by the United States. The Corps of Engineers of the Army loses officers through this cause, and finds it difficult to obtain proper material from the graduates of civil technical institutions for the same reason. That it has been able to retain in the service so many able men must be attributed to the fact that army life with its peculiar conditions has for some an attraction great enough to offset the disadvantages of inadequate salaries and of the self-denial which must be exercised by men in the Army to provide for the support of their families and the education of their children.

"It is therefore evident that with the present arrangement the Government obtains the administration of its river and harbor work in a highly just, economical and efficient manner, without any additional cost for such administration. Moreover, the Army to that extent is self-supporting, and a portion of its personnel is obtaining valuable training which will make them more efficient military engineers in time of war, without expense to the United States.

"It has been claimed that a Department of Public Works will avoid duplication of work in various Departments. It is possible that in some instances there may possibly be duplications of work of an engineering nature in the different existing departments of the Government. Any such instances are, however, very few and are in minor points. While it is undoubtedly a fact that different departments are engaged on somewhat similar engineering work, yet it is likewise a fact that these works are for different purposes and are essentially different on account of the diverse missions of the departments concerned. Both in their execution and in the training and experience required for their personnel, these activities are along essentially different and independent lines. The statements that under the present organization of the Government the Supervising Architect's Office and the Quartermaster Corps of the Army are both engaged in the construction of public buildings under separate and unco-ordinated departments of the Government; that the Reclamation Service and the engineers of the War Department are independently engaged on the improvement of the rivers of the country; that the Interior Department, the Department of Commerce, and the War Department are all separately engaged in the production of maps, etc., seem to some to be proof of duplication with ensuing inefficiency and waste. The same citizens however, would be startled if a great firm of architects, heretofore, engaged in

the design and erection of monumental buildings, should undertake the wholesale construction of inexpensive dwelling houses; they would not engage dredging contractors to build a reservoir in the hills, nor go to the country land records to buy an automobile route map. These citizens look with disapproval on great concentrations of non-related activities in private enterprises, knowing by experience that inefficiency and poor service, as well as monopolistic prices and red tape delays are their usual consequences. A somewhat detailed consideration of some of these supposed duplications may not be amiss.

"The Office of the Supervising Architect mainly designs public buildings of an expensive and permanent class and supervises their construction, generally under contract. This is a special line of practice and is conducted by specially trained architects for the design and by expert builders for the erection of the work. These architectural specialists have had probably no experience nor could their skill be used in the other activities with which the bill proposes to combine them.

"Construction work for the United States Army is at present done by the Quartermaster Corps, which is charged with the construction, maintenance and repair of buildings and other structures and with the operation of utilities on military posts. New constructions required in time of peace are generally simple and under ordinary conditions constitute only a small part of the work, the greater part being the maintenance and repair of roads, water supplies, systems of sewage disposal, and buildings. Such construction as is done has little in common with that performed by the Office of the Supervising Architect because it is as a rule more simple and frequently less permanent; certainly by no means so monumental. It cannot be satisfactorily done by men who are not familiar with the needs and customs of the Army and under control of the army authorities.

"River and Harbor improvements, Mississippi River Commission, California Débris Commission; to these should be added another important duty connected therewith and now charged to the War Department, which so interlocks with the construction work that it cannot be separated, namely, the enforcement of the laws for the protection and preservation of the navigable waters of the United States. River and harbor improvements constitute a specialty in engineering practice, one with which civil engineers in general are at best only slightly familiar. In the bills proposing a separate department, this has been recognized by the provision that officers of the Corps of Engineers of the Army now engaged on these works shall remain under the new department for a period of years. The officers of the Corps of Engineers which now performs this service are graduates of the Military Academy and of the technical schools of the country. They enter the service as young men. After being commissioned, they are given a special course of instruction in river and harbor work at a post-graduate school and later continue this education by acting as assistants in the various Engineer Districts. It is generally considered by the authorities of the Corps that an officer is not sufficiently trained to take charge of a District until he shall have served in the Army for about ten years. The greater part of the subordinate work is done by civilian assistants, changing in number in accordance with the volume of work ordered by Congress, and employed in accordance with the Civil Service rules. It is rare that an efficient assistant engineer can be obtained directly from civil life. It has been found necessary to start them in subordinate engineering positions and to train and gradually promote them through the various grades to that of assistant engineer. Their specialty is quite different from the other activities with which this bill proposed to merge them. The nearest approach is found in the Reclamation Service, already in the Interior Department, but the problems of the Reclamation Service are, in general, directly opposite to the problems met in river and harbor improvements. In the Reclamation Service, the object may be stated generally, as a dissipation of streams for

irrigation, while that of river and harbor improvement is mainly the concentration of streams for navigation uses. Only one class of works constructed by the Reclamation Service is similar to those required in river and harbor improvement, namely, the dams; otherwise the two services are not closely allied. But even in this one feature the resemblance is not close, as the problems met in the construction of a high reservoir dam are very different from those of constructing a lock and low dam in a river.

"The works of the California Débris Commission and the Mississippi River Commission are river and harbor improvements and require the same class of technical experts for their design and completion.

"The execution of the laws for the protection and preservation of the navigable waters of the United States includes the supervision of bridge plans as to the location and clear height and width required for the waterways which they span; the establishment of harbor lines to prevent improper encroachments on navigable waters; the granting of permits for all structures in navigable waters, the supervision of dams, drainage canals and other works which would affect the flow of these navigable waters, etc. These duties are highly technical. The laws of the United States for the protection of navigable waters are little studied by people in general, and even lawyers in long practice are, as a rule, not conversant with them. Almost invariably projects of encroachments on navigable waters are strongly pressed by local interests. Such questions must be solved from a National standpoint, and there is no class of duties under the Government which requires more tactful handling or a more foresighted judgment as to the best national policy. This work is so intimately connected with the improvement of rivers and harbors that it cannot well be separated therefrom.

"The Coast and Geodetic Survey.—This is a body of expert surveyors, computers, and draftsmen whose main purpose is providing charts for sea navigation. Its duty corresponds in a measure with the duties now performed by the U. S. Geological Survey for land maps, and to a portion of the duties required for harbor improvement, but it is a mistake to think the same preparation is needed for the land surveys of the Geological Survey and for the hydrographic work done by the Coast Survey. Technical men specialize on each class of surveying, and efficiency requires that the organization for each be kept separate, whether they operate under one head or not. There is an apparent overlapping of the map work done by the Geological Survey, the Coast and Geodetic Survey, and the Corps of Engineers, but this overlapping is small, since each of the services makes full use of the work done by the others, and real duplication of work does not occur. Regardless of who does them, a certain amount of overlapping must be permitted in order that these various kinds of surveys may join properly. This apparent duplication is discussed later.

"The Bureau of Standards.—This Bureau performs a highly specialized duty which has almost nothing to do with the other activities mentioned. Its work must be carried out in a separate organization by experts who are not interchangeable with the men of the other service. It is difficult to see how efficiency would be promoted by the transfer proposed.

"The Bureau of Public Roads.—Highway design and construction is another specialty in civil engineering. A river and harbor expert, an irrigation expert, or an architect, is not usually a highway expert. As a part of its duties as military engineers, the Corps of Engineers of the Army must be familiar with highway work, and has performed important work of that character in the past. So, also, the Quartermaster Corps of the Army must be familiar with such work; but the highway building has little or no relation with the other activities proposed to be united with it and certainly its specialists are not interchangeable with those belonging to other bureaus. A merger which has for its basis the utilization of a road engineer as an architect or



the designer of a great dam, is illogical. If it does not so use him the bill is illogical.

"The Forest Service is another special service requiring experts in no way interchangeable with the men of the other activities mentioned. It is difficult to see what gain would accrue from merging them into the same organization.

"The one activity which might with some advantage be consolidated with others is in certain proposals omitted from the duties of the new department. The Lighthouse Bureau of the Department of Commerce is charged with the duty of maintaining aids to navigation. It is essential that these aids be co-ordinated with improvements or changes in the channels. Close co-operation between the District Engineers, engaged in river and harbor improvements, and the Supervisors of the Lighthouse Districts is indeed now maintained by arrangement between the departments; but if the public works are to be revised on a theoretical basis, the Lighthouse Service should be included since the structures of this Service are not greatly different from those frequently occurring in river and harbor improvements.

"It is claimed that a Department of Public Works will give greater opportunity for the engineers of the country to take part in public works. This is an error. In order to conduct the various public works an organization, or organizations must be formed. Due to the varying amount of work authorized from year to year these organizations must be elastic and capable of expansion or reduction. This necessitates a small permanent body which can be expanded or decreased as necessary by taking or discharging the subordinates requiring less experience precisely as is done to-day. To get the proper class of men this smaller body must be well paid and must be composed of men who have advanced from the lower to the higher grade as increasing age and experience warrant. To safeguard the Government their positions must be permanent. They must be entirely free from local or political influence. Except that they do not belong to the Army the organization charged with river and harbor work will under the proposed bills be precisely similar to the Corps of Engineers of the Army except that the men entering the new service would not have received the training traditional with the Military Academy. They would have to be taken, just as are a portion of the Corps of Engineers to-day, from young men just graduated from technical institutions and then trained in their special duties until they become experts. It is difficult to say how the profession at large would receive greater opportunities under such a system than it does to-day, except that a few civilian engineers would replace Army engineers, at the expense of the military resources of the nation.

"One argument made by those advocating a Department of Public Works is that it will draw up related plans for all National engineering projects and thus eliminate 'pork-barrel' appropriations. This is a criticism of Congress, as Congress alone has the final authority in regard to the amounts of appropriations and the manner and purposes for which they shall be expended. As has been shown before, there is no close relationship between the various engineer projects, and this argument still further indicates the tendency which this new department would have of making the engineer work the final end and mission rather than one of the means or instruments for the larger mission. The adjustment of engineer projects, as between the various departments, which have engineering operations, can readily be obtained in another manner. That this can be done has been clearly shown by the work of the Federal Board on Surveys and Maps. This Board was the result of a complaint from various engineering societies that there is duplication in the surveying and mapping work of the various departments of the Government. As a result of a thorough investigation of this work in all the departments, the Federal Board came to the conclusion that there was very little, if any, actual duplication, but that it might be advisable in connection with the work of each Department to consider the necessities of other departments, and, where it could be done, to pre-



pare surveys and maps in such a way that other departments could make use of them. As indicated above, however, it was found that the use to which various maps were to be put in the several departments was of such a different nature that the work which one department can do for another is rather limited.

"To the argument that it will promote centralization and standardization it may be added that centralization up to a certain point is desirable and necessary but beyond that point it is more of a hindrance than a help. Centralization likewise involves the idea of drawing together matters which are closely related to each other. As has been indicated above, this is not, except in a few instances, the case with engineering and construction activities in the various departments of the Government. In case of the establishment of a Department of Public Works, it would be necessary, as has already been stated, to organize practically as many separate entities handling the different types of engineering work as are now in existence in the various governmental departments. In this connection, it is noted that centralization of engineering functions is not the rule of industrial organizations. In a railway system, for example, the construction engineers, the maintenance engineers, and the operating engineers generally report to different heads.

"So far as standardization is concerned, it may likewise be carried beyond the point of efficiency. The various types of engineering work differ in certain particulars which demand that the organizations, methods and materials used in connection with them likewise must differ in some respects. As a matter of fact, however, a great deal of reasonable and advisable standardization could be obtained in the same manner as was described above in connection with the central body for handling the mapping and surveying in the different departments.

"It is maintained by the advocates of a Department of Public Works that it will conform to the practice of foreign countries and some of our own States. As an illustration of this argument the State of Illinois is used. It has a Department of Public Works created largely through the efforts of Governor Lowden. However, a brief examination of this concentration as well as the so-called Department of Public Works in foreign countries, which are pointed to as examples of efficiency in distinction to the inefficiency which it is claimed results from the lack of such a department in our Federal Government, shows no such wholesale collecting of very large and diverse bureaus as the proponents of the bill would undertake. It is a very simple thing to combine a few engineering bureaus at the capitol of one of our forty-eight States where such bureaus put together would possibly not amount to as much as a single division of one of the bureaus of the Federal Government. In the same way, investigation would show that the so-called Departments of Public Works in some of the European countries have only a very few separate engineering functions, such, for example, as roads, bridges, and canal construction, and where many of the bureaus found in Washington, and which the proponents of the bill desire to combine, are entirely absent in the organizations of the foreign governments. Moreover, it is thought that a careful investigation of such foreign departments will show that the engineering work is only a part of the duties of the Department of Public Works, as this department in most of these countries is charged with broader duties, having to do with the general operation, care and location of these utilities, the engineering feature again merely being an auxiliary one. Such a plan as is proposed for a Department of Public Works in the United States might be satisfactory in a small area like that of some of the European countries or some of our States and still be impracticable in one of the extent of the United States. No country has actually tried to place all kinds of engineering work, such as is proposed in this case, in a single department but only a small portion and generally only

such as are now entrusted to the Corps of Engineers with the addition of road work.

"It is believed that the passage of a bill establishing a Department of Public Works would be a serious blow to the military resources of the United States and an actual source of danger in case of future wars. It is thought that this phase of the subject has not been carefully considered by the proponents of the various bills which have been introduced in Congress on this subject. It is idle to elaborate on the fundamental principle that the defense of the country is the first duty of the Government. Wherever the military resources of the country can be increased without undue cost, the necessary measures to that end are desirable. But when the test of war has just proved that a certain organization of the Government adds material military resources for the defense of the country, without cost to the United States, it is folly to entertain the idea of its destruction. The different phases of this matter will be considered in detail below.

"That an Engineer Service with the Army in the Theatre of Operations in time of war is essential admits of no argument. The functions of the engineer who provides the roads, railroads and other means by which great concentrations can be effected, have taken on an importance which has never existed heretofore. The engineer troops of the United States forces during the war amounted to over 14 000 officers and 311 000 men, of which about 10 000 officers and 240 000 men were used in France. This force was organized and equipped with a minimum of friction or delay. The work done in this country embraced the organization of some 380 different regiments or small units, ranging in character from service battalions for rough construction work to the highly specialized units for the direction of artillery fire by means of delicate sound-recording apparatus; furnishing these organizations with personnel of appropriate capacity; and equipping them with the vast variety of tools, machinery and instruments necessary for their tasks. It included the establishment of numerous camps for the instruction of officers in their military duties. The railroad regiments of engineers were the first new units to be sent to France. In the operations in France the engineers performed with efficiency the many duties that fell to them including many works of magnitude. While other bureaus may have been swamped by demands incident to the war, the Engineer Department successfully expanded without any fundamental re-organization.

"As a supplemental statement, it is noted that the officer personnel, and especially those at the head of the Army Engineering Service, must be trained engineers. This statement also needs no argument or explanation, as the result of placing an untrained man in charge of engineering work is too obvious to need discussion.

"Also, as a corollary of the main statement that an Engineer Service is needed, it is noted that this service must be headed and controlled by men familiar with military methods and needs. It is thought that this requirement has been largely overlooked in connection with the use of engineers for military service. The statement has been made that civil engineers with no military training could have performed the duty and taken charge of the work in the rear areas in France equally as well, without the trained military engineers of the Corps of Engineers at their head. A brief consideration of this statement will indicate its fallacy. Here, again, engineering is merely a means to an end. If those who are directing this engineering are not thoroughly familiar with the end to be accomplished and the various means, methods and requirements connected with the accomplishment of this end, their work would be largely futile. The Corps of Engineers of the Army is a military body receiving instruction in the various military duties of the various branches of the service, and being thoroughly indoctrinated with the general principles and methods used by the Armies of the United States. They are known personally to the

senior officers of the Army—that is, to those who will have command—and these officers have confidence in and rely on the officers of the Corps of Engineers to carry out their part of the work of the team in accordance with the general principles which must govern the entire organization. It would be practically impossible for a man untrained on the military side to efficiently carry on or direct the necessary engineering works in the immediate rear of the Army, and it would, of course, be out of the question for him to carry out the military works with the troops in the front line.

“It is impracticable in time of peace to maintain in the regular service more than a nucleus of the required war organization. The military policy adopted by Congress is against a large standing army. As a consequence, the officer personnel of the Corps of Engineers is only a small fraction of the number of officers required in a war of any proportions. At the present time, the size of this officer personnel in the Corps of Engineers is based not only on its military duties, but also on its duties in connection with the river and harbor work throughout the country. If this work is taken away from the Corps of Engineers, the personnel would be still further reduced and the nucleus of men having the necessary combined civil and military experience would be correspondingly smaller.

“It is necessary that this nucleus have every facility in time of peace to prepare for its war functions. The past war has shown how heavy are the duties and responsibilities which in time of war devolve upon the Corps of Engineers of the Army. The object of this legislation and its effect, if enacted into law, is to relegate the officers of the Corps of Engineers in time of peace to study without practice. There will be no opportunity for an engineer officer of the Army to obtain the practical experience and development which can come only through being charged with the responsible duties of engineering, and if this plan were carried into law, a future great war would find a Corps of Engineers who might be learned men, but who, having been subjected for years to a life without adequate professional work, would be as competent to perform their duties as would be a surgeon who had studied but never practiced, or a lawyer who had never appeared before a Court. Through the prior experience gained by officers of this Corps there were saved in this late war sums greater than all the money spent in the past on river and harbor improvements, not to speak of the saving in life to the Army at large. Development cannot come without responsibility and experience, nor can experience be gained without practice. The civil duties with which the Corps of Engineers has been charged since the earliest days of the nation, have been the school which has given the maximum value in the training and development of engineer officers for war.

“The efficiency of Engineer Officers in war would be much impaired if they did not in peace actively practice their profession. The practice of the Engineering Profession involves the use of large quantities of material, and however willing Congress might be to give the proper training to Engineer Officers, it would never be willing to waste public money in the expenditure of material for merely training purposes.

“Practically all the bills which have been proposed in Congress contemplate the removal of civil works, such as river and harbor works, from the Army to a new department or bureau. In addition to this, however, some of the bills propose the transfer of the construction work of the Army having to do with the construction and repair of Army posts, camps, etc., to this new department. The dangers in connection with the transfer of civil works have been commented on. The seriousness of the proposal to transfer all construction work intimately connected with the Army to the new department seems to have been recognized in certain bills which retain with each existing department of the Government those particular engineering features solely connected with that department.



"The transfer of the construction work of the Army to a separate organization would be a serious blow and would be another instance of the failure to differentiate between the end and the means. Construction activities of the Army are not undertaken with the end of erecting barracks, storehouses, etc., but are for the purpose of the shelter and service of the Army. No matter how well and efficiently such buildings may be constructed, they are useless and the money spent upon them is wasted if they do not meet the present needs of the military service rather than those of the past. Even within the War Department it has been necessary and undoubtedly will be necessary in the future to curb the tendency of officers charged with construction to plan according to their own lights rather than according to the real needs of the users. Such a tendency would be many times magnified if the construction is in charge of a different department. Constant friction, lack of co-ordination, and resulting red tape, inefficiency and waste of public funds would be the consequence of such an organization. Army construction proper should be maintained under the direct control and carried on by a body of men subject to the orders of the military authorities.

"If the bill should pass establishing a new department, and transfer to that new department not only the civil works now under the Corps of Engineers of the United States Army, but also Army construction work under the Construction Division of the Quartermaster Department, it will leave to the Corps of Engineers and to the Army at large only the limited amount of actual engineering work included in the construction of fortifications as the sole method in time of peace of obtaining practical engineering experience to fit the Army engineer for his duties in time of war. In view of the changed nature of fortification work, under which movable mounts on railway carriages are largely taking the place of fixed emplacements, this type of engineering work will be very materially reduced. This kind of construction work deals mainly with static, known forces, and, while this work is extremely valuable as a preparation for similar work in time of war, it does not give the same experience, the same training of the mind, and the same ability to meet emergencies that engineering work connected with forces which are less known and which are subject to variation, will give. In the various realms of engineering, with probably the exception of tunnel work, construction work connected with rivers and harbors seems to involve more features along the lines necessary in the training of the military engineer than any other type. Water is an extremely uncertain quantity, and when we take into consideration the uncertainties of foundations, the variable flow of rivers, and the probability of sudden freshets and cloudbursts, it can readily be seen that the demands on the individual in charge are such as to require prompt decision, based on accurate knowledge and sound judgment. These qualities are those needed to cope with the emergencies which arise in time of war in actual conflict with the enemy, and can only be developed by experience and practice.

"The immense and diverse tasks of the Engineer Department during the war, both in France and at home, were performed by an organization which numerically speaking was recruited almost entirely from civilian life for the emergency. It included the best engineering capacity along all lines that the country afforded. It thus fell to the small nucleus of regular officers of the Corps of Engineers to supervise and operate an organization more than twice as large as our pre-war army, and engaged in work which involved every conceivable form of engineering, practiced by the profession in the United States. The results achieved by the Engineer Department in the war would have been impossible without the unstinted efforts and unflinching devotion of the great mass of men who entered for the emergency, and who performed without regard to their personal predilection the duties assigned to them. But it would equally have been impossible had not the Chief of Engineers had at his disposal a group of officers who were acquainted with the personnel and



practice of the Engineering Profession, and competent to direct members of that profession; and who at the same time, by virtue of being commissioned officers of the Army, familiar with military problems, were able to co-ordinate the work done with military exigencies. This combined training in civilian and military practice has been attained, and can be attained, only by the existence in time of peace of a group of officers, engaged with profit to the nation in river and harbor improvement, but with the military training and experience to mould, train, and direct the mass of engineer material which in time of war is so hastily summoned. Just before the entry into the war there were about 125 officers of the Corps of Engineers engaged on construction work in the United States. Just prior to the Armistice this number had been reduced to 6. The difference formed the reserve of trained officers, mostly of high rank and long experience, available to the Chief of Engineers to be placed in general charge of the major projects. Yet the present bill would destroy this reserve for a future emergency.

"Through its organization for civil works, including district offices under officers of the Corps of Engineers in all the larger cities, with sub-offices at the various works throughout the districts, the officers of the Corps of Engineers are brought in close contact with the people of the United States, especially those engaged in engineering and construction, in a way that could not be done in strictly military duty. This contact enables engineer officers to form a much better understanding of the popular feeling of the United States than is possible to the average officer. It also enables them to become acquainted with the various civil engineers and understand their special lines of work. The country must depend for its engineer work in time of war to a very great extent on the civil engineer who comes into the service, but who, being without military training, finds difficulty in adjusting himself to the military conditions. This was shown in the past war, where some of the most eminent civil engineers in the country were unable to work smoothly in the military machine. The officer of the Corps of Engineers must act as the co-ordinator of the engineer part of the Army. It will be his duty to so place the civil engineers who come in as temporary officers as to obtain the greatest value of their services. The broad acquaintance obtained on river and harbor work was of the greatest value in France, as from this knowledge the officers in positions of high responsibility were able to place the temporary officers in the positions which they were best fitted to fill.

"Through the creation of the Engineer Reserve Corps, a large number of engineers who joined the Army during the war have been created Reserve Officers. This represents one of the most effective and economical steps that has been taken in recent years by the United States in the cause of preparedness. By this means, it will be possible with little delay, in an emergency, to multiply many times the commissioned strength of the Corps of Engineers. But these men, in time of peace, look to the regular officers of the Corps of Engineers for such training and organization as is given them. In time of war they look to them for leadership in the tasks which they will perform. And to take away from the Corps of Engineers its peacetime training in practical engineering is largely to destroy its ability to control and operate this splendid reserve from civilian life. It is to strike at the brain of the organization so recently created, and having such magnificent potentialities of service in time of national danger.

"The local chapters of the Society of American Military Engineers to which the local officer of the Corps of Engineers on river and harbor work, and practically all Engineer Reserve Officers in the neighborhood belong, afford an ideal means to form that bond between the regular Engineer officers and the Organized Reserve which by higher authority in the Army is deemed so necessary to weld the Regular Army, National Guard, and Organized Reserve into one army of the United States. Withdrawal of the river and harbor works

from the Corps of Engineers means the loss of this close touch, without which the reserve officer will gradually lose interest and finally be lost to the Army. "It may be urged that some of the proposed bills will provide a reserve of trained officers under the clause providing that, for the purpose of acquiring instruction, training and experience, members of the Corps of Engineers of the United States Army may, with the consent and approval of the Secretary of Public Works, be detailed for temporary duty under the Department of Public Works to such duties as may be deemed best adapted to the purposes of such detail. However attractive this provision may appear, it would certainly fail of its purpose. There may be an idea in the minds of some that the requisite skill in the conduct of public works can be readily acquired, and that officers temporarily detailed to such duties could be placed in positions in which they would be usefully employed, with advantage to the work and to their professional education. The Chief of Engineers knows too well that such is not the case. The work is far too important to entrust responsibility to officers on temporary duty, over whom the chief of the service has no control and whose experience is limited. Officers must be carefully selected for the positions they are to fill. In its practical application, it is hardly probable that the Department of Public Works would give any real responsibility to men detailed merely temporarily, and without having actual charge of the work, and without the responsibility that goes with it, a temporary connection with the work or a mere tour of observation would be of minor value in the training and instruction of officers. It might be of some value for the younger officers; but in reality the Corps of Engineers, especially the older officers, would be wholly separated from the execution of public works.

"The organization of the Engineer Department at Large has been referred to above. The subdivision into districts, with sub-posts and stations throughout the districts, forms a network covering the entire country. The administrative and executive officers of this network are officers of the Corps of Engineers directly under the Chief of Engineers. The duties of these officers in connection with river and harbor works require them to be familiar with transportation and business conditions throughout their respective districts, and they are, therefore, in close touch with the various business and transportation organizations. An extremely valuable fund of information on any business activity throughout the country can be and frequently is obtained on short notice. This organization is under military men knowing military needs, and it can in case of emergency be placed directly under the military establishment.

"Moreover, a close connection is readily established between engineer units of the organized reserve and the district engineers. In fact, in many cases these officers are assigned to duty with or actual command of reserve organizations in addition to their other duties, and these organizations are thus utilized as a part of their training and may assist in gathering information of military importance.

"At this time when economy is demanded, it would seem inadvisable to eliminate an organization doing useful work, which, at the same time, is ready for immediate use in connection with National defense. The substitution of a civilian organization in place of this semi-military organization would not serve the same purpose. It would not be under local control of men familiar with military requirements, could not be closely connected with the Organized Reserve, and being in a separate department of the Government could not be placed in emergency completely under military authority.

"Very respectfully,

"LANSING H. BEACH,

"Major General, Chief of Engineers."

Subsequently, at the afternoon session, the Committee on Federal Re-organization, consisting of Messrs. Charles F. Loweth, Chairman, Willard T. Chevalier, Arthur H. Markwart, Leonard Metcalf, and Charles H. Paul reported.

It was also reported that the proceedings of this Committee had already been forwarded to the Board of Direction, describing the audience had with the President of the United States on October 30, 1923, when the Committee transmitted the resolutions passed by this Board on April 16, 1923. The Committee made a second visit to Washington, D. C., on December 11, 1923, following up the matter.

Copies of the advance report on the Public Works Conference held January 9, 1924, in Washington, D. C., under the auspices of the Federated American Engineering Societies, at which representatives of about sixty engineering, architectural, and allied organizations were present, were distributed. The Society was represented at this Conference by President Charles F. Loweth, Vice-President C. E. Grunsky, Secretary John H. Dunlap, and Messrs. Charles H. Paul, and F. C. Wight. The following resolution was unanimously adopted for presentation to the Congressional Joint Committee on Government Re-organization:

"Whereas, the present structure of the Federal Departments represents the unpruned growth of many years and is imperfectly adapted to present needs; and

"Whereas, definite recommendations have been made by both President Harding and President Coolidge emphasizing the need of a re-organization of public business, and a plan of general re-organization of departments is under consideration by a Joint Committee of Congress; and

"Whereas, the engineers and architects, and related technical professions of the country have for many years advocated the establishment of a National Department of Public Works in which the matters relating to public works might be administered and co-ordinated; and

"Whereas, the consideration of recent bills for the creation of a Department of Public Works was suspended in the interest of a general re-organization; and

"Whereas, this subject has received the careful consideration of this conference representing more than sixty engineering and architectural and related organizations from all sections of the country; and

"Whereas, the establishment of a Department of Public Works would make it possible to place governmental engineering, and architecture on planes reflecting the highest achievements in these professions, known to the world; and

"Whereas, a co-ordinated functioning of all public works agencies would be able to stabilize business and employment by expanding public work when private industry and employment may be slack, and by reducing such work as far as practicable when private industry may be fully absorbing the available supply of men and materials; and

"Whereas, the advance and co-ordinated planning of public works is sound economy in that it permits the Government to execute less work at peak prices and more work at the lower prices prevailing during dull times; be it, therefore,

"Resolved: That this Conference of engineers and architects, and allied interests, heartily approves the movement for a re-organization of Federal Departments, and it particularly endorses grouping and co-ordinating within

an existing department, preferably re-named a Department of Public Works, the construction and administration of all non-military public works."

#### APPROVAL OF MINUTES

On motion, the minutes of the meetings of the Board of Direction held October 15 and 16, 1923, were approved.

On motion, the minutes of the meeting of the Board of Direction held November 26, 1923, were approved.

#### PHOTOGRAPH OF MEMBERS OF THE BOARD OF DIRECTION

On motion, it was decided to have a group photograph of the Directors taken in the Board Room at 2 P. M., January 15, 1924.

#### APPROVAL OF EXECUTIVE COMMITTEE MINUTES

On motion, the minutes of the meeting of the Executive Committee held December 12, 1923, and the Supplement thereto, were approved and the actions therein outlined, adopted as the action of the Board with the exception of the five recommendations, the approval of which was considered separately. (The action of the Board on these recommendations is given subsequently in these minutes.)

#### ABSTRACT OF MINUTES OF MEETING OF EXECUTIVE COMMITTEE, DECEMBER 12, 1923

The Executive Committee met at 10:45 A. M.; President Charles F. Loweth in the chair; John H. Dunlap, Secretary; and present, also, Messrs. Holland, Ridgway, Webster, and Treasurer Hovey.

The minutes of the meeting of this Committee of October 1, 1923, were approved by the Board of Direction at its meeting on October 16, 1923.

#### PROPOSED BUDGET FOR 1924

The proposed Budget for 1924 was considered and adopted for recommendation to the Board of Direction.

Recess was taken at 12:45 P. M.

The Committee reconvened at 2 P. M., with the same attendance as in the morning:

On motion, it was decided to recommend to the Board of Direction a remission of the \$1200 loaned to the Alfred Noble Memorial Committee.

It was decided to leave to the Secretary and Treasurer the development of a plan whereby the annual business transacted during any given year can be more readily ascertained. The resident members of this Committee are then to examine the plan which will be presented to the Board at its next meeting.

#### ADDITIONAL AMOUNTS TO COVER 1923 APPROPRIATIONS

Postage, Current Business, Fall Meeting, Miscellaneous, and Alfred Noble Memorial Committee accounts will cost more than has been allowed by the 1923 Budget, as follows:



	1923 Appropriation.	Additional amount requested.
Postage Account .....	\$9 300	\$1 700
Current Business .....	4 850	2 150
Fall Meeting .....	1 000	600
Miscellaneous .....	1 000	607
Alfred Noble Memorial Committee..	500	522

On motion, it was decided that this Committee would recommend to the Board that the additional amounts requested be allowed.

#### ALTERATIONS ON THE FIFTEENTH FLOOR

At the meeting of the Executive Committee held June 25, 1923, the Secretary and Treasurer suggested that the Executive Committee recommend to the Board the payment for alterations on the Fifteenth Floor of the entire sum from invested funds, which suggestion was adopted.

#### PHOTOGRAPHS OF PAST-PRESIDENTS

The Board of Direction at its meeting in Richmond, Va., October 15, 1923, approved the policy of substituting photographs for paintings of the Past-Presidents of the Society, and appropriated \$350 for the entire work. Through correspondence in regard to this matter, it developed that photographs printed on autotype carbon tissue are the only ones recommended for absolute permanency.

It was recommended therefore that the resolution adopted at the meeting of the Committee held October 1, 1923, be rescinded, and that the following be substituted:

*"Resolved:* That it be recommended to the Board of Direction that the Secretary be instructed to have photographs made of the pictures of all Past-Presidents of a uniform size and style, using the autotype carbon process, the photographs to be suitably framed and labelled, and that the sum of \$1 200 be appropriated to cover the cost of the work."

On motion, the foregoing recommendation was adopted.

#### ST. LAWRENCE WATERWAY

At the last meeting of this Committee, it was decided to recommend to the Board of Direction that a Special Technical Board to Investigate and Report upon the Improvement of the St. Lawrence River be appointed by Congress constituted so as to represent all phases of the problem and that other Engineering Societies be invited to co-operate. This matter was brought to the attention of the Society in April, 1923, by the Cleveland Engineering Society, which adopted a resolution urging the enactment of legislation providing for such Special Technical Board.

The Board approved the recommendation of the Executive Committee, it being understood that this Committee would direct the course of action to be taken.

The other three Founder Societies and the Federated American Engineering Societies were informed of the action of the Board and were asked for assurances of co-operation and suggestions.

On motion, the Secretary was instructed to communicate with the Committees of the United States Senate and House of Representatives handling this matter, recommending that a Commission, either on the part of this country, or a joint commission, be appointed to give further study to the essential facts with reference to a St. Lawrence Waterway, to guide the action of Congress with respect to its construction. Further, that copies of such letter be sent to the Local Sections of the Society, as well as to the other Founder Societies and the Federated American Engineering Societies, asking them to

reinforce the recommendations of this Society in such manner as they deem practicable and possible.

PROGRESS OF PURCHASES UNDER WEEKS LAW OF FOREST LAND  
IN THE EASTERN MOUNTAINS

The letter dated June 11, 1923, from the Society for Protection of New Hampshire Forests, calling attention to the progress of purchases of forest land under the Weeks Law in the Eastern mountains, was referred to the Public Relations Committee for report to the Board. The Public Relations Committee reported to the Board of Direction at its meeting on October 15, 1923, and the Board adopted the report, copies of which were distributed to the Committee, together with the following suggestions from Chairman Brown of the Public Relations Committee in answer to a request from President Loweth for suggestions about what action should be taken:

"I would suggest the following:

"1—That the Committee, of which you are Chairman, appointed for the purpose of bringing about joint action of the four Founder Societies on public matters, present this question to the representatives of the other Societies with a view that they all work in harmony on the subject.

"2—That attention of Local Sections be called to the report and suggestions made that the subject be discussed, to the end that all Local Sections do what they can to further the movement in their respective States.

"3—That the New York office watch carefully for developments in Washington during the coming session of Congress, in order that if any amendment to the Weeks' Bill or a new Bill be presented, which meets with the Society's approval, the interest of the Society be used to further such Bill, or, on the contrary, if not meeting our approval, it can be opposed.

"I am taking steps to have the matter discussed by the St. Louis Section in the near future and anticipate bringing it before the Associate Societies later in order that the St. Louis engineers may be thoroughly 'sold' on the subject in time for constructive action at the next meeting of the Missouri Legislature in the fall of 1924."

On motion, the foregoing suggestions made by Director Brown were approved.

CENTRAL COMMITTEE ON LUMBER STANDARDS

At the last meeting of this Committee a letter dated July 21, 1923, was presented from the Central Committee on Lumber Standards, asking this Society to subscribe toward defraying the expenses of the office of the Central and Consulting Committees on Lumber Standards. After discussion, it was decided that the Society should not contribute to this work, as it is largely a manufacturer's problem, and the financial resources of the Society do not permit of assisting further than the payment of the expenses of its representative.

SOCIETY INVITED TO DESIGNATE REPRESENTATIVE ON COMMITTEE TO STUDY  
SUBJECT OF PREFERRED NUMBERS

At the last meeting, a letter was presented to the Committee, dated August 23, 1923, from the American Engineering Standards Committee inviting the Society to designate a representative on the Committee to study the subject of preferred numbers.

On motion, the President was authorized to appoint such representative.

## AMERICAN PEACE AWARD

In a letter of November 26, 1923, the Policy Committee of the American Peace Award asked to present to the membership of this Society, the importance of their participating in the nation-wide "referendum" to be conducted on the winning plan by the American Peace Award.

On motion, it was decided that the taking of a referendum is not consistent with the accustomed practice of the Society.

## AMERICAN SOCIETY OF ENGINEERS

Data received at this office was presented concerning the formation of the American Society of Engineers, the National Headquarters of which will be in Cook County, Illinois.

It was decided to ask Society's Counsel to call the attention of the American Society of Engineers to the fact that the name of the American Society of Civil Engineers had been in existence for more than seventy years and as there was a possibility of conflict in the names, this Society protested. It was also decided to call the attention of the American Society of Mechanical Engineers and the Illinois Section of the Society to this matter.

## PAYMENT OF MILEAGE TO GOVERNMENT EMPLOYEES FOR ATTENDANCE AT SCIENTIFIC CONGRESSES, ETC.

A letter dated December 1, 1923, from the Washington Academy of Sciences, forwarding the resolution voted at a recent meeting of the Board of Managers of the Academy, was presented, together with a statement of some of the present legal limitations imposed on scientific workers in Government departments in regard to attendance at conventions and congresses.

On motion, this matter was referred to the Committee on Public Relations.

## WORLD POWER CONFERENCE, LONDON, ENGLAND, JULY, 1924

No formal report has been received from Messrs. George A. Orrok and Peter Junkersfeld the Society's representatives in this matter. Oscar C. Merrill, Chairman of the Federal Power Commission, has called several conferences, a program has been outlined, and a suggested list of members of the General Committee of the American Division has been compiled.

President Loweth addressed the Committee stating that each of the Founder Societies would probably receive an invitation from its sister society in England, the plan being to hold meetings at the time of the World Power Conference.

He further explained that the Society would not necessarily be at the expense of sending a delegate, or holding a Convention, but that members who would be in attendance at the World Power Conference might be appointed as representatives of the Society as it would be unfortunate if such action were taken on the part of the other Founder Societies and not by the American Society of Civil Engineers.

## CONVENTION OF SANITARY ENGINEERS TO BE HELD IN ENGLAND IN 1924

It was reported that a letter dated October 23, 1923, from the Chairman of the Executive Committee of the Sanitary Engineering Division states that a Committee of the Division has been appointed to co-operate with a similar Committee of the Sanitary Engineering Section of the American Public Health Association in arranging for a Convention to be held in 1924 in England, under the auspices of the Institution of Sanitary Engineers, and that it is expected the Committee which consists of Messrs. T. Chalkley Hatton, Chairman, R. O. Wynne-Roberts and George B. Kershaw, will report at the Annual Meeting of the Society.

APPOINTMENT OF MEMBER ON SECTIONAL COMMITTEE ON FIRE TESTS  
OF MATERIALS AND CONSTRUCTION

A letter dated November 23, 1923, from the American Society for Testing Materials, was presented, inviting this Society to appoint a member on the Sectional Committee on Fire Tests of Materials and Construction.

On motion, George E. Strehan, Assoc. M. Am. Soc. C. E., was appointed on such Sectional Committee.

HEAT TRANSFER THROUGH WALL STRUCTURES

A letter dated November 7, 1923, was presented from the U. S. Bureau of Standards, enclosing the report of a Conference on Heat Transfer through Wall Structures, held at the Bureau, on October 22, 1923, asking the Society to endorse the program.

On motion, it was decided to ask Rudolph P. Miller, M. Am. Soc. C. E., for his opinion in this matter. Subsequently, Mr. Miller's report was received and as it was favorable, the U. S. Bureau of Standards was written to accordingly.

ANNUAL TABLES OF CONSTANTS AND NUMERICAL DATA, PHYSICAL,  
CHEMICAL AND TECHNOLOGICAL

The foregoing Tables are published by an International Commission under the authority of the International Research Council and the International Union of Pure and Applied Chemistry. In a letter dated November 22, 1923, Mr. E. W. Washburn, the American Commissioner, asks whether the Society will continue its appropriation of \$100 for the year 1924.

On motion, it was decided to contribute \$50 to the foregoing for 1924.

ALLOTMENT FOR SYRACUSE SECTION FOR 1923

In July, 1923, Secretary Throop, of the Syracuse Section, requested an allotment for the current year, and on October 10, 1923, renewed his request, stating that he could send a list of 26 members.

On motion, this request was allowed, but with the understanding that hereafter Sections organized after July 1 shall be allowed only one-half the allotment for the year.

STANDING COMMITTEE ON REGISTRATION OF ENGINEERS

At its meeting of October 15, 1923, the Board adopted a resolution authorizing the President to appoint a Standing Committee on Registration of Engineers. As the Board at its meeting on October 2, 1922, in San Francisco, Calif., when the Secretary suggested that Article IV, "Committees", be amended to provide for a Committee on Professional Conduct, decided it was not necessary to include all Standing Committees in the By-Laws, it is asked whether it is necessary to amend the By-Laws, in order to call for the appointment of a Standing Committee on Registration of Engineers.

(The By-Laws provide for the following Standing Committees: Executive Committee, Public Relations Committee, Committee on Technical Activities and Publications, and the Committee on Research.

Those not provided for in the By-Laws are: Local Sections, Student Chapters, Professional Conduct, and Honorary Membership).

It was decided not to change the By-Laws to provide for a Standing Committee on Registration of Engineers.

COMMITTEE TO PREPARE ANNUAL REPORT

On motion, the Chairmen of the Standing Committees of the Board of Direction were appointed a Committee to prepare the Annual Report of the



Board for presentation to the Annual Meeting as called for in the Constitution.

The following items were reported for the record:

*Committee to Conduct Investigation of the Effects of Earthquakes on Structures in Japan and Elsewhere:*

At the last meeting of this Committee, the President was authorized to appoint a committee to conduct the proposed investigation of the effects of earthquakes on structures in Japan and elsewhere.

The President subsequently appointed Messrs. J. D. Galloway, Chairman, Isami Hiroi, John Millis, C. H. Snyder, and C. B. Wing.

Invitations to serve as consulting members have been issued to: Messrs. Teiji Ebashi (has accepted), and Masayoshi Kabashima (has accepted), and Baron Hempei Nagao.

Letters inviting co-operation have been written to: Engineering Institute of Canada, Institution of Civil Engineers, Société des Ingénieurs Civils de France, Associazione Nazionale Ingegneri Italiani, and the Japanese Civil Engineering Society.

*National Immigration Policy:*

A letter dated November 15, 1923, from the Managing Director of the National Industrial Conference Board, invited this Society to appoint delegates to a Conference for the discussion of a National Immigration Policy, to be held in New York, N. Y., on December 13-14, 1923.

President Loweth appointed as such delegates Messrs. F. A. Molitor and W. J. Wilgus.

*Special Committee on Stresses in Railroad Track Receives Donation of \$2 500 from the Illinois Steel Company:*

A letter dated November 14, 1923, from the Chairman of the Special Committee on Stresses in Railroad Track, transmitted a check for \$2 500 from the Illinois Steel Company for the use of his Committee.

The Carnegie Steel Company has contributed \$1 250 which has been sent to the American Railway Engineering Association for this same Joint Committee and Professor Talbot states further contributions are expected.

The President reported that another contribution of \$1 250 had been received and transmitted to the A. R. E. A. for the work of this Committee.

*Society for the Promotion of Engineering Education:*

The Board at its meeting of July 10, 1923, in answer to invitation from the Society for the Promotion of Engineering Education to this Society to appoint two of its members as Councillors to confer with its Board of Investigation and Co-ordination, authorized the President to appoint two members as Councillors to serve without expense to the Society, one to be from New York and the other to be from the vicinity of New York.

President Loweth has appointed Messrs. F. C. Shenehon and J. Waldo Smith as such representatives.

*George Washington University:*

In response to an invitation to be represented at the inauguration of William Mathew Lewis as President of the George Washington University, President Loweth appointed William H. Bixby, M. Am. Soc. C. E.

*American Academy of Political and Social Science:*

An invitation was presented to the Board at its meeting of October 15, 1923, from the American Academy of Political and Social Science to send from one to three delegates to the Conference on "The Government, The People and the Price of Coal", to be held at Philadelphia, Pa., on November

16-17, 1923. The action taken was to authorize the President to appoint such delegates.

President Loweth appointed Messrs. W. S. Twining, John Meigs, and Frank C. Wight.

*Secretaries of Founder Societies Made Members of Engineering Division of National Research Council:*

At the last meeting of this Committee, a letter was presented from the Division of Engineering, National Research Council, suggesting that the Secretaries of the Founder Societies be added to the representation on Engineering Division. The President was authorized to appoint Secretary Dunlap to serve.

*North Carolina Section of the Society:*

The Board of Direction at its meeting on October 16, 1923, decided to approve the Constitution of the proposed North Carolina Section of the Society when received, if in proper form, and to authorize the formation of such Section as soon as the necessary membership of twenty-five was secured.

The Constitution of this Section in correct form was received on November 9, 1923, 55 members having expressed their desire for the formation of this Section. Organization was effected on November 9, 1923, and Charles E. Waddell, M. Am. Soc. C. E., was elected President, and Thorndike Saville, Assoc. M. Am. Soc. C. E., as Secretary-Treasurer.

*Marine Congress:*

The last meeting of this Committee authorized the President to designate a representative to serve on the general Committee of the American Marine Congress, to be held November 5-10, 1923, in New York, N. Y.

President Loweth appointed A. M. Hunt, M. Am. Soc. C. E., as such representative.

*American Lumber Standards:*

A letter dated November 12, 1923, from the Chief of the Division of Simplified Practice of the U. S. Department of Commerce, invited this Society to send representatives to a general conference to take action on the recommendations for simplified sizes, nomenclature, and certain trade practices presented in a report entitled "Recommended American Lumber Standards as Reported to the U. S. Department of Commerce by the Central Committee on Lumber Standards, Washington, D. C., October 31, 1923".

President Loweth appointed Messrs. E. A. Frink and Earl Stimson to attend this Conference which is to be held on December 12, 1923, in Washington, D. C.

**EFFORT TO INCREASE MEMBERSHIP IN TECHNICAL DIVISIONS**

On motion, the authority requested was granted the Secretary to send a letter to the membership regarding Technical Divisions, with an enrollment blank, together with an up-to-date issue of the "Aims and Activities" pamphlet, similar to that issued in 1923.

**CHANGE RECOMMENDED IN PRINTED SHEET ENTITLED  
"INFORMATION FOR APPLICANTS"**

The Secretary called attention to the sentence in the printed sheet which is issued with application forms entitled "Information for Applicants" stating: "No account is to be taken of work done before the applicant is 18 years old \* \* \*" and to the sentence in the Constitution of the Society that "A Junior shall not be less than eighteen years of age \* \* \*. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing."

On motion, it was decided to recommend to the Board that the sentence in the printed sheet be changed to read: "No account is to be taken of work done before the applicant is 16 years old \* \* \*"

#### CHANGE IN APPLICATION FORM

The Secretary reported that his attention had been called to the cases of two applicants for admission to this Society who had been dropped from another Society for non-payment of dues.

Discussion developed that this was felt to be an important point and that the application form should be changed to require the giving of information, not only as to present membership in Engineering Societies, as is now the case, but also as to what societies applicants have been members in the past, and, if they severed their connection with any society, whether they resigned in good standing, or the reason for dropping out.

Adjourned at 6:30 p. m.

Action was taken by the Board of Direction on the five recommendations considered separately, as follows:

#### 1924 Budget:

After discussion the following Budget was adopted for recommendation to the incoming Board:

Items.	Estimated Income for 1924.
1 Entrance Fees .....	\$ 17 000
2 Dues .....	208 500
3 Binding .....	8 000
4 Sale of Badges .....	4 850
5 Sale of Certificates .....	787
6 Sale of Publications .....	5 300
7 Interest on Bank Deposits .....	1 200
8 Interest on Bonds .....	2 710
9 Annual Meeting .....	3 550
10 Rent from 57th Street Property .....	22 703
11 Postage .....	200
12 Miscellaneous .....	1 500
	<hr/> \$276 300

Items.	Proposed Appropriations for 1924.
13 Salaries of Officers .....	\$15 100
14 Clerical Help .....	55 520
15 Cost of Publications .....	70 000
16 Postage .....	11 000
17 General Printing .....	5 000
18 Office Supplies .....	3 330
19 Badges .....	3 245
20 Certificates of Membership .....	535
21 Binding .....	6 000
22 Reading Room .....	500
23 United Engineering Society:	
Rent .....	6 439
Library .....	8 000
Telephone and Incidentals .....	1 200
John Fritz Medal Board .....	125

24 Furniture and Office Equipment .....	5 200	
25 Traveling Allowance of Officers.....	18 600	
26 Traveling Allowance of Standing Com- mittees .....	2 000	
27 Work of Committees .....	11 500	
28 Annual Meeting .....	6 515	
29 Annual Convention.....	1 500	
30 Spring Meeting .....	1 500	
31 Fall Meeting .....	1 500	
32 Monthly Meetings .....	1 000	
33 Annual Prizes.....	355	
34 Interest on Mortgage.....	10 000	
35 Insurance .....	150	
36 Current Business .....	3 320	
37 Miscellaneous .....	1 500	
38 Retirement Allowances.....	7 500	
39 Employment Bureau .....	1 815	
41 Local Sections .....	7 400	
42 Technical Divisions .....	3 000	
43 Alterations to Vault 57th Street .....	250	
		\$270 599
Unappropriated Balance* .....		5 701
		\$276 300

Recess was taken at 12:50 P. M.

The Board reconvened at 2 P. M., with the same attendance as in the forenoon, except that Director Holland was also present.

#### APPROVAL OF EXECUTIVE COMMITTEE MINUTES CONTINUED

##### *Additional Amounts to Cover 1923 Appropriations:*

On motion, the recommendation of the Executive Committee was granted that the allowance be approved of additional amounts requested to cover 1923 appropriations for Postage, Current Business, Fall Meeting, Miscellaneous, and Alfred Noble Memorial Committee.

##### *Alterations on Fifteenth Floor:*

On motion, the recommendation of the Executive Committee was approved that the payment for alterations on the Fifteenth Floor be made from cash on hand (this rescinds the former action that payment be made from Invested Funds, it being understood that Invested Funds would be reimbursed to the extent of 20% each year until cost was paid).

##### *Photographs of Past-Presidents:*

On motion, the recommendation of the Executive Committee was approved that the resolution adopted at its meeting on October 1, 1923, be rescinded and that the following be substituted:

*"Resolved:* That the Secretary be instructed to have photographs made of the pictures of all Past-Presidents of a uniform size and style, using the

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\* \$5 000 of this amount is to go into a Reserve Fund.



autotype carbon process recommended by the Research Department of the Eastman Kodak Company, the photographs to be suitably framed and labeled, and that the sum of \$1 200 be appropriated to cover the cost of the work."

On motion, the Secretary was authorized to select an official photographer to photograph the Past-Presidents of the Society of whom there is no picture and to continue that policy in order that a complete collection may be preserved.

#### *Application Forms:*

On motion, the recommendation of the Executive Committee was approved that the sentence in the printed sheet issued with Application Forms, entitled "Information for Applicants" be changed to read: "No account is to be taken of work done before the applicant is 16 years old \* \* \*".

On motion, the action of the Executive Committee was approved in changing the Application Form to require information from applicants on present and past membership in engineering societies, and, if connection with any society had been severed, whether they resigned in good standing, or the reason for dropping out.

#### COMMITTEE ON BUST OF CAPTAIN EADS

Vice-President Davison, of the Committee on Bust of Captain Eads, reported progress.

#### PUBLIC RELATIONS COMMITTEE

##### *Report on Secretary Mellon's Proposed Tax Reduction on Earned Incomes:*

The following report was presented from Chairman Brown of the Public Relations Committee:

"January 9, 1924

"THE BOARD OF DIRECTION

AMERICAN SOCIETY OF CIVIL ENGINEERS  
New York City, N. Y.

"GENTLEMEN.—Under date of December 27, 1923, President Loweth submitted letter of J. B. W. Gardiner, Assoc. M. Am. Soc. C. E., suggesting that the Society support the plan of the Secretary of the Treasury relative to the reduction of Income Taxes.

"The time has been too limited to secure an expression of opinion from the members of the Public Relations Committee. However, believing that this matter is of such import to the public in general and especially to the engineers of the country, I respectfully present the following resolutions concerning the matter and recommend their approval by the Board:

"Whereas, Federal Taxes as at present levied exercise a great restrictive influence on the prosperity of the country, its industries and commerce, and impose an oppressive burden on the earnings of the individual citizen; and

"Whereas, the welfare of the country, its citizens, industries and commerce, demands that the burden of taxation be lightened to the greatest possible extent consistent with governmental requirements; and

"Whereas, the Secretary of the Treasury of the United States has presented to Congress and to the people of the country a proposed tax plan, comprehensive in detail, constructive in effect, non-partisan in character, which if enacted into law will greatly decrease the individual tax burdens and

stimulate the general prosperity of the country and all of its citizens by increasing the influx of capital into the streams of commerce, industry and needed public improvements; therefore,

"Be It Resolved, That the American Society of Civil Engineers, through its Board of Direction, approves and endorses the Bill advocated by the Secretary of the Treasury for the revision of Income Taxes, and respectfully urges upon the Congress of the United States its immediate passage.

"Be It Further Resolved, that copies of this resolution be sent to the President of the United States, the Secretary of the Treasury, all National Engineering Societies, the Local Sections of the American Society of Civil Engineers, and such officials as the President of the Society may designate.

"Yours truly,

"BAXTER L. BROWN,

Chairman, Public Relations Committee."

After discussion, on motion, these resolutions were adopted for recommendation to the Annual Meeting, after omitting the words "through its Board of Direction" in the fourth paragraph and substituting therefor the words "in Annual Meeting assembled".

*Resolution Regarding Scientific Congresses, Conventions, and Meetings, Submitted by the Washington Academy of Science:*

Under date of December 15, 1923, a resolution regarding Scientific Congresses, Conventions, and Meetings, was submitted by the Washington Academy of Science, with a request that the American Society of Civil Engineers approve the following resolution:

"Resolution, That the Washington Academy of Sciences hereby petition and urge the President, the heads of departments of the Federal Government and the Congress of the United States to give the welfare of science in the United States their earnest consideration and assistance; and to provide by law and by appropriation of the necessary money for the attendance of such scientists of the government as heads of departments may designate at scientific congresses, conventions and meetings in this country; and for the attendance of such scientists of this country both in the government and in private life as may be recommended to the Department of State by competent authority and approved by the head of that Department or the official acting for him, as representatives of the United States of America at International Scientific Congresses, Conventions and Meetings. These appropriations would be exceedingly small as compared with the returns from them in great benefits to scientific advance in America and hence to the promotion of the national welfare."

On motion, it was decided to be inexpedient for this Society to adopt the foregoing resolution.

COMMITTEE ON WAYS AND MEANS OF MAKING THE ENGINEERING SOCIETIES  
LIBRARY OF GREATER USE TO ITS MEMBERS

Chairman Fenkell, of the Committee on Ways and Means of Making the Engineering Societies Library of Greater Use to Its Members, presented a report.

The following motion in regard to this matter was carried:

"That the report of Chairman Fenkell's Committee be referred to a Committee of three to confer with appropriate committees from the other Founder

Societies, including a representative of the Library Board, and that the present committee be discharged with thanks."

#### COMMITTEE ON CO-OPERATION DISCHARGED

During the discussion at the morning session, the formation of the Joint Conference Committee, as outlined by the Committee on Co-Operation, consisting of Messrs. Charles F. Loweth, Chairman Willard T. Chevalier, Arthur H. Markwart, Leonard Metcalf, and Charles H. Paul, was approved. It was reported that the memorandum of the proceedings of this Committee had already been forwarded to the members of the Board, covering the creation of a Joint Conference Committee consisting of the four Presidents and four Secretaries of the Founder Societies. The formation of such Joint Conference Committee has been approved by the other three Founder Societies and an informal meeting of the Committee was held on December 10, 1923. Copies of the minutes of that meeting were forwarded to members of the Board on December 12, 1923, and the resolution contained therein regarding Engineering Foundation was reported.

On motion, the Committee on Co-Operation was discharged.

#### COMMITTEE ON DISMISSAL OF PAST-PRESIDENT DAVIS

Past-President Webster stated that the other member of his Committee, John F. Stevens, Hon. M. Am. Soc. C. E., had gone to California for an extended stay. He suggested that the Committee be discharged and that a Committee be appointed, as occasion may arise, by the President, of members familiar with Reclamation work, which motion was duly seconded and carried.

#### FINANCIAL REPORT FOR YEAR ENDING DECEMBER 31, 1923

The Executive Committee, at its meeting of December 12, 1923, decided to leave to the Secretary and Treasurer the development of a plan whereby the annual business transacted during any given year can be more readily ascertained. The resident members of the Executive Committee were then to examine the plan which was to be presented at this meeting.

As a result of the meeting which the Sub-committee of the Executive Committee had held, a statement prepared on the new basis of the business transacted in 1923 was presented.

It was moved and carried that the financial statement given in the new report be approved and that the principle of continuing this report for the benefit of succeeding Boards be continued.

#### HIRAM F. MILLS' FUND MADE PERMANENT

The Secretary called attention to the Hiram F. Mills' legacy of \$2 000, which, on motion, was added to the permanent funds of the Society.

## OCCUPANCY OF UNITED ENGINEERING SOCIETIES BUILDING

At the meeting of the Board of Direction in July, 1923, the question was brought up of the issuance from the Engineering Societies Building of propaganda of a commercial character, which it was believed should not be sent out. The representatives of the Society on the United Engineering Society were asked to submit to the Board a statement of what determines the conditions of occupancy of the building, and the activities of the occupants. President Loweth requested Vice-President Ridgway, who is one of the Society's representatives on United Engineering Societies, to investigate this matter.

The following letter from Mr. Ridgway was presented:

"49 Lafayette Street, New York, N. Y.  
December 28, 1923.

"MR. JOHN H. DUNLAP,  
Secretary, AMERICAN SOCIETY OF CIVIL ENGINEERS,  
33 West 39th Street,  
New York, N. Y.

"DEAR MR. DUNLAP.—This refers to your letter of July 23, 1923, addressed to Mr. George H. Pegram, Colonel W. J. Wilgus, and myself, relative to the matter brought up by Director Richard L. Humphrey regarding the issuance from the Engineering Societies Building of propaganda of a commercial character which he stated he did not believe should go out, but which he had reasons to believe was being issued.

"As President Loweth had requested me to look into this matter, I asked Mr. Humphrey to advise me further of his complaint and to give me some idea of the character of the objectionable circulars or publications which he thought were being issued. This he agreed to do, but no information was received, and at the meeting of the Board of Direction at Richmond last October, Mr. Humphrey stated that he desired information only concerning 'what determines the conditions of occupancy of the (Engineering Societies) Building and the activities of the occupants.'

"I have accordingly taken the matter up with Mr. J. Vipond Davies, President, and Mr. Alfred D. Flinn, Secretary, of the United Engineering Society, both of whom have expressed perfect willingness to give any general or specific information.

"Mr. Flinn states that no written code of standards has been prepared for the admission of occupants to the Engineering Societies Building, and that 'it has been determined that in the future no taxable occupants other than those already in the building (shall) be admitted. Further than that, any organization applying for space which may become vacant is investigated by the House Committee, and if acceptable, allotment of space is recommended by that Committee to the Trustees. It does not seem practicable or suitable for U. E. S. to establish a censorship upon the publications of the Societies occupying offices in the building.'

"The Trustees of the United Engineering Society regard the building as ultimately available for the exclusive use of the four Founder Societies. However, at the present time, the occupancy of the building, in part, by other organizations is a decided help in carrying the financial burden. This occupancy will, of course, diminish as the Founder Societies grow and require additional space.

"Should any one possess knowledge of improper practices on the part of any occupants of the building, evidence of the same should naturally be submitted to the United Engineering Society.



"The Secretary, Mr. Flinn, prepared on December 17, 1923, a list of the occupants of the building, a copy of which is herewith enclosed. On this list those subject to tax are so indicated.

"A draft of this report has been submitted to Col. W. J. Wilgus and Mr. George H. Pegram and they have informally expressed their approval of it.

"Yours very truly

"ROBT. RIDGWAY"

"Copies to Messrs. Pegram and Wilgus."

"UNITED ENGINEERING SOCIETY

FOUNDER SOCIETIES

29 West 29th Street

New York City

"December 17, 1923.

"Memorandum for Mr. Robert Ridgway:

"*Occupants of Engineering Societies Building.*—American Engineering Standards Committee; American Institute of Electrical Engineers; American Institute of Mining and Metallurgical Engineers; American Society of Civil Engineers; American Society of Heating and Ventilating Engineers; American Society of Mechanical Engineers; American Society of Safety Engineers; American Welding Society; Association of Edison Illuminating Companies (Taxable); Employment Service of Founder Societies; Engineering Foundation; Illuminating Engineering Societies; Library, Engineering Societies; National Association of Engine and Boat Manufacturers (Taxable); National Electric Light Association (Taxable); National Research Council (Division of Engineering and Marine Piling Committee); New York Electrical Society; New York Society of Architects; Society of Automotive Engineers; Society of Naval Architects and Marine Engineers; Society for Promotion of Engineering Education (Board of Investigation and Co-ordination); Taylor Society; United Engineering Society; Municipal Engineers of City of New York.

"(SG.) ALFRED D. FLINN,  
"Secretary."

After discussion, the following motion was carried:

"That it is the sense of this meeting that it is undesirable to have taxable occupants in the Engineering Societies Building and that the representatives of the American Society of Civil Engineers on the Board of Trustees of United Engineering Society be instructed to convey that fact to the Board of Trustees of United Engineering Society."

Recess was taken at 6:05 P. M., to reconvene at 8 P. M., as a Membership Committee.

The Board reconvened on adjournment of the Membership Committee with the same attendance as in the afternoon except that Messrs. Begien, Davison, Grunsky, Loweth, Webster, and Treasurer Hovey were absent.

The report of the Membership Committee was presented, and on motion, was adopted as the action of the Board.

The Board adjourned about 11:45 P. M.

**January 15, 1924.**—The Board reconvened at 10:00 A. M.; President Charles F. Loweth in the chair; John H. Dunlap, Secretary; and present, also, Messrs. Begien, Brown, Chester, Condron, Curtis, Darrow, Dyer, Fenkell, Freeman, Grunsky, Hogan, Holmes, Huber, Humphrey, McConnell, Marston, Mason, Ridgway, Talbot, Webster, Whitman, Winsor, Yates, and Treasurer Hovey.

#### DESIRABILITY OF SECURING A COMMISSIONED STATUS FOR SANITARY ENGINEERS

At its meeting of July 9, 1923, a letter dated June 26, 1923, was presented to the Board from the Federated American Engineering Societies explaining that, as the Sanitary Engineers of the U. S. Public Health Service do not enjoy a commissioned status they are handicapped in their work in many ways, and that a Bill covering the matter would probably be introduced at the next session of Congress.

This Board referred the matter to the Sanitary Engineering Division of the Society which appointed a Committee consisting of Messrs. George W. Fuller, Chairman, Morris Knowles, W. L. Stevenson, and George C. Whipple. This Committee is co-operating with other organizations to promote the passage of a Congressional Bill that is intended to correct certain inequitable policies which it is believed obtain at present in this service. A letter of January 7, 1924, from the Chairman of the Executive Committee of the Sanitary Engineering Division, was presented, transmitting the following resolutions prepared by the Committee, to be presented to the Division on January 17, 1924, and stating:

"It is the desire of our Executive Committee that these resolutions receive the approval of the Board of Direction at its next meeting, and, if agreeable to them, that the same Committee, consisting of Messrs. George W. Fuller, Chairman, Morris Knowles, W. L. Stevenson, and George C. Whipple, be appointed by the Board to represent the Society at large, as well as the Division in this matter. Such action, we believe, would facilitate and promote our efforts to remedy an existing inequitable situation in this Service:

"Whereas, the work of sanitary engineers is essential to the protection and promotion of the Public Health, and

"Whereas, the sanitary engineers in the United States Public Health Service are not now commissioned officers, and

"Whereas, the commissioning of such sanitary engineers would improve the service and thereby benefit the public, and

"Whereas, a bill entitled 'A Bill to Promote the Efficiency of the United States Public Health Service' has been prepared by the United States Treasury Department, which, in providing for the improvement of the service, authorizes the commissioning of sanitary engineers as well as other scientific personnel in the United States Public Health Service, and

"Whereas, This bill was unanimously approved at a joint meeting by committees of the American Society of Civil Engineers, the American Public Health Association and the Federated American Engineering Societies, Therefore, Be It

**Resolved,** That the Board of Direction of the American Society of Civil Engineers endorses this bill as a first step in the advancement of the status of sanitary engineering in the United States Public Health Service, and Be It Further

**Resolved,** That a copy of this resolution be sent to the President of the United States, to the Secretary of the Treasury and the Committees of the Senate and the House to which this bill is referred."

The President explained that several engineers had had interviews with officials in Washington in this matter, and after discussion, on motion, the Committee of the Sanitary Engineering Division of this Society previously named, was made a Special Committee of this Society without mileage.

On motion, the foregoing resolutions were adopted.

#### MEETINGS TO BE HELD ABROAD IN SUMMER OF 1924

The minutes of the Executive Committee Meeting of December 12, 1923, give the status, to that date, of the World Power Conference to be held in London, England, in July, 1924, and of the Convention of the Sanitary Engineers to be held under the auspices of the Institution of Sanitary Engineers in England in 1924.

On motion, the Executive Committee was given authority to make any necessary arrangements for participation in joint meetings in connection with the foregoing.

#### PARTICIPATION BY SANITARY ENGINEERING DIVISION OF THIS SOCIETY IN INTERNATIONAL CONFERENCE ON SANITARY ENGINEERING

It was reported to the December 12, 1923, meeting of the Executive Committee that a Committee of the Sanitary Engineering Division of this Society is co-operating with a similar Committee of the Sanitary Engineering Section of the American Public Health Association, in arranging for a convention of Sanitary Engineers to be held under the auspices of the Institution of Sanitary Engineers in London, England.

On motion, such co-operation by the Sanitary Engineering Division, was approved.

#### INSTITUTION OF CIVIL ENGINEERS INVITES MEMBERS OF THE SOCIETY TO MAKE USE OF ITS PREMISES

The following correspondence with Secretary Jeffcott, of the Institution of Civil Engineers, was presented:

"THE INSTITUTION OF CIVIL ENGINEERS  
Great George Street, Westminster, S. W. 1,  
December 21, 1923.

"THE SECRETARY,

THE AMERICAN SOCIETY OF CIVIL ENGINEERS,  
33 West 39th Street, New York

"MY DEAR SIR.—I am desired by the Council to ask you to convey to those of your members who may be in London next Summer in connection with the various functions that are then to take place, the very cordial invitation of this Institution to make use of its premises, and of any services which the Institution office may be able to render to them personally. It is intended to have a room set apart for our Engineering Visitors from Overseas in which they may be able to meet friends and conduct correspondence; and, further, if it will be a convenience to them, the Institution will be pleased for them to use this postal address and will arrange to forward letters to indi-

vidual members to any temporary addresses they may advise from time to time during their stay on this side.

"Believe me to be, with kind regards,

"Yours very faithfully,

"H. H. JEFFCOTT,

"Secretary."

January 2, 1924

"DR. H. H. JEFFCOTT,

*Secy.*, THE INSTITUTION OF CIVIL ENGINEERS

Great George St., Westminster, S. W. 1

London, England

"MY DEAR SIR.—It is with great pleasure that I acknowledge on behalf of our Board of Direction, the receipt of your kind invitation of December 21, to our members, to make such use of the facilities of the Institution next Summer as may prove convenient in connection with the various functions that are then to take place.

"I will present your kind invitation to the Board of Direction at its next meeting January 14, on which occasion I am sure the Board will be greatly pleased at your thoughtful consideration for the convenience and comfort of our members who are planning to visit London.

"In the summer of 1922, some informal correspondence occurred between the Institution of Civil Engineers and this Society in regard to the possibility of the American Society of Civil Engineers holding a Convention in England in 1923 or 1924. Due to the world situation at that time it seemed best to the Board of Direction not to continue the correspondence to the stage of receiving a formal invitation from the Institution of Civil Engineers, but rather to indicate that the entire Board of Direction would look forward to the pleasure of holding a meeting of our Society in England on some future occasion. In view of the fact that a considerable number of our officers and members are likely to be in London next summer, may I inquire if in your opinion it would be wise to use this opportunity as a means of renewing in some formal way the bonds of friendship between the Institution and our Society? I will be greatly pleased to co-operate in carrying out here any suggestion that may seem to you to be appropriate.

"Believe me to be with kind regards,

"Yours very faithfully

"JOHN H. DUNLAP,

"Secretary."

On motion, the Secretary was authorized to express the appreciation of the Board of Direction for the courtesies extended when answer to the Secretary's reply is received.

#### NATIONAL IMMIGRATION POLICY

It was reported to the December 12, 1923, Executive Committee meeting, that Messrs. F. A. Molitor and W. J. Wilgus were appointed to represent the Society at a Conference held December 13-14, 1923, in New York, N. Y., for the discussion of a National Immigration Policy, in response to an invitation from the National Industrial Conference Board. Their report of December 27, 1923, states, in part:



"By alternating our attendance we succeeded in covering practically the entire meeting. The meeting, as you will understand, was a conference only, and designated to bring out broad views representing the various angles of the subject. It was very well attended, with representatives from the various groups interested in the subject.

"It is presumed that the many remarks made were taken down and it is understood that these remarks will be printed and given broad publicity, with a view of informing the public and others interested in the legislation that is necessary, the present Immigration Act expiring by limitation in June, 1924.

"The conference being limited to discussion only, resolutions were not in order, so that no action could be taken by the American Society of Civil Engineers at this time. It is hoped, and we recommend, however, that the Society shall study the subject with a view of endorsing some constructive suggestions for the Congress. We are firmly of the opinion that no single body is more interested in the general labor and immigration subject than our profession and we feel, therefore, that it should be heard through our Society.

"As we were uninstructed, we took no part in the discussion."

In this connection, the following resolution on immigration was presented, which was passed by the National Industrial Conference Board, at its meeting of December 20, 1923:

*"Preamble:* Investigations into the Immigration problem conducted by the National Industrial Conference Board, and the discussions at the National Immigration Conference in New York on December 13 and 14, 1923, have clearly shown that there is a great divergence of opinion and lack of information on some of the most fundamental questions vital to the formulation of an adequate National Policy of Immigration Control. Even on so important a subject as the needs of normally functioning industry, commerce, and transportation, and the extent to which immigrant labor is necessary to supplement the native supply, no data adequate for broad judgment are available.

"Moreover, while the Immigration question has been debated officially and privately for more than a century, major attention has of late tended to focus on certain aspects of the Immigration problem which are new in the field of scientific inquiry, such as questions in respect to the measurement of intelligence, the effects of intermarriage of different races, economic and social assimilability of foreign racial groups, and similar matters. These are now being urged as bases for action; yet such approach to the Immigration problem through science is still in its early stage. While considerable investigational work along such lines has already been carried on, no basis has yet been established for evaluating the significance of these studies to the solution of the Immigration problem.

"The Board's investigations have demonstrated that Immigration is a many-sided problem and that to decide it on any one set of factors, whether economic, social, political, or racial, is not likely to provide the permanent policy which is needed. Due regard should be had for the needs of normally functioning industry, commerce, and transportation; yet a broad conception of public policy must recognize also that the kind of immigrants admitted into the United States is of even greater importance than the number, and that what happens to immigrants after they are admitted into the country is of no less significance than the conditions fixed as essential for their admission. It is generally conceded that selection based on quality should be the basic consideration in any permanent policy of Immigration Control; no generally accepted method of such selection, however, nor a satisfactory program of adequately caring for immigrants after their arrival has so far been suggested. It is, therefore,

"Resolved, that because of lack of fundamental information on many crucial points, the need of examining, evaluating, and supplementing the recent scientific investigations, and the need of formulating practical methods of selection and assimilation, in respect to an adequate policy of National Immigration Control, the National Industrial Conference Board recommends to its Affiliated Organizations:

"1.—That they urge the appointment of a competent Commission to be appointed by the President of the United States, to inquire into and to report within a definite period on the major factors of the Immigration Problem, some of which are:

- (a) Immigration and Emigration in the light of present domestic and world conditions;
- (b) Needs of normally functioning industry, commerce, and transportation for an adequate labor supply and, in so far as the native supply is insufficient, for immigrants generally and for special groups of immigrants;
- (c) Economic and social assimilability of foreign racial groups;
- (d) Effect of mixture of races upon the virility and social progress of the Nation;
- (e) Practical methods of selecting, distributing and assimilating immigrants;
- (f) Suggestions for an adequate, scientific and practical program of Immigration based on an analysis of the aims and ideals of our National life.

"2.—That they recommend that, pending the results of such investigation and action thereon, the Percentum Limit Act now in force is retained, but with such administrative changes in the law as experience has shown to be advisable in order to facilitate operation and enforcement of the law and to eliminate unnecessary hardships and injustices now resulting from such enforcement."

A letter dated January 11, 1924, from Col. Wilgus to Col. Molitor, was read, stating that he would be in favor of the endorsement of the foregoing resolution by the Board if a few changes could be made, which were enumerated. Col. Molitor has not yet replied.

After discussion, a motion was adopted to refer the report of Messrs. Wilgus and Molitor to the Executive Committee with power.

#### SUGGESTED JOINT COMMITTEE ON STEEL HIGHWAY BRIDGES

In a letter dated December 20, 1923, Chairman Clifford Older, of the Committee on Standards of the American Association of State Highway Officials, states that the Executive Committee of that Association has authorized the co-operation of the Association with other interested societies in the formation of a Joint Committee on Steel Highway Bridges, and that if this Society would be interested in the formation of such a Joint Committee, the American Association of State Highway Officials would be glad to co-operate.

(Under date of October 6, 1923, Secretary Fritch of the American Railway Engineering Association wrote to President Loweth and to President Bennett, of the American Association of State Highway Officials, explaining that all three Societies had formulated specifications for steel highway bridges; that a comparison of the three specifications discloses many minor differences which could undoubtedly be reconciled in a conference of representatives of the

interested associations; that it was considered probable that such conference could bring the three specifications into much nearer accord in matters where there is material difference; and that Chicago, Ill., and January 31, 1924, have been arranged as the place and time for such Joint Conference.)

A letter of December 8, 1923, from Lee H. Miller, Assoc. M. Am. Soc. C. E., states the interest of the American Institute of Steel Construction, in the proposed Joint Conference and requests that it be permitted to co-operate.

A letter from Chairman Seaman, of the Special Committee on Specifications for Bridge Design and Construction of the Society, was read.

A motion was adopted to leave the matter in the hands of the President with power.

#### SUGGESTED AMENDMENT TO ARTICLE I, SECTION 3, OF THE BY-LAWS

The Secretary reported the following suggested amendment to Article I, Section 3 of the By-Laws:

Add to second line of Section 3 of Article I, of the By-Laws, the following: "subsequent to the meeting at which the applicant is classified."

This change would make the Section then read:

"3.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each member of the Board of Direction subsequent to the meeting at which the applicant is classified, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. In case of exclusion, no notice thereof shall be entered on the minutes, but the candidates shall be notified.

"A rejected applicant may renew his application for membership or transfer at any time after the expiration of one year from the date of the ballot rejecting his previous application."

Vice-President Ridgway stated he would offer such amendment which will come up for final action at the next meeting of the Board.

#### SUGGESTED AMENDMENT TO ARTICLE II, SECTION 2, OF THE BY-LAWS

Article II, Section 2, of the By-Laws, reads as follows:

"The Secretary shall notify each member at his last address appearing upon the books of the Society of the amount due for the ensuing year, at the time of giving notice of the Annual Meeting."

The Secretary suggested that the last clause of this Section which now reads "at the time of giving notice of the Annual Meeting," be eliminated and a clause reading "Not later than December 1," be inserted at the beginning of the Section.

The Section will then read as follows:

"2.—Not later than December 1, the Secretary shall notify each member at his last address appearing upon the books of the Society of the amount due for the ensuing year."

Director Winsor stated he would offer such amendment which will come up for final action at the next meeting of the Board.

## SUGGESTED AMENDMENT TO ARTICLE III OF THE BY-LAWS

The Secretary reported the following suggested amendment to Article III of the By-Laws:

Add new Section 6:

"6.—In case of temporary inability of the Secretary or the Treasurer through illness or other cause to certify and countersign, or to sign, checks against the funds of the Society, the Executive Committee shall designate the proper person to perform such duties."

Re-number present Sections 6 and 7, Sections 7 and 8, respectively.

Director Condron stated he would offer the foregoing amendments which will come up for final action at the next meeting of the Board.

## SECRETARY FORMALLY AUTHORIZED TO EMPLOY CLERICAL HELP, ETC.

Article V, Section 3, of the Constitution states: "\* \* \* All other officers or employees shall hold office or position during the pleasure of the Board of Direction."

Article III, Section 1, of the By-Laws states: "The Board of Direction shall \* \* \* appoint all its employees; \* \* \*"

The Secretary respectfully recommended that the Board authorize him to employ such clerical or other assistants as may be necessary for the proper conduct of the business of the Society, and to make minor adjustments of the salaries of employees, not exceeding the total appropriation for clerical help.

On motion, the authority requested was granted.

## WOMEN'S AUXILIARY

It was reported that the American Society of Mechanical Engineers had recently formed a Women's Auxiliary. The American Institute of Mining and Metallurgical Engineers have a similar Auxiliary; but the American Institute of Electrical Engineers has not.

On motion, the possible formation of a Women's Auxiliary by the American Society of Civil Engineers was referred to a Committee to be appointed by the incoming President.

## POWER DIVISION REQUESTS RULING ON DISBURSEMENT OF FUNDS

A letter was presented, dated December 19, 1923, from Secretary Maloney of the Power Division, stating that the members of the Executive Committee of the Division feel that an Appropriation Account and a Dues Account should be carried, and asking certain questions about the disbursement of Division funds.

On motion, the foregoing request was referred to the Executive Committee with power.

## REVISED CONSTITUTION OF POWER DIVISION APPROVED

It was reported that under date of January 2, 1924, the revised Constitution of the Power Division of the Society had been received.

On motion, this revised Constitution was approved.



**REVISED CONSTITUTION OF IRRIGATION DIVISION APPROVED**

It was reported that under date of January 8, 1924, a revised Constitution of the Irrigation Division of the Society had been received for approval by the Board.

On motion, the revised Constitution of the Irrigation Division was approved.

**REVISED CONSTITUTION OF ILLINOIS SECTION APPROVED**

A letter was presented, dated January 5, 1924, from the Secretary of the Illinois Section, forwarding five proposed amendments to the Constitution of the Illinois Section for approval by the Board. The Secretary reported that he had examined these amendments and that they conform to the rules.

On motion, the five proposed amendments to the Constitution of the Illinois Section were approved.

The motion that the Illinois Section be authorized to change its name, should such be advisable, was laid on the table.

**ATLANTA SECTION REQUESTS CHANGE OF NAME TO GEORGIA SECTION**

A letter, dated January 8, 1924, was presented from the Atlanta Section, stating that at its January, 1924, meeting, at which a constitutional majority was present, it was voted to enlarge the Atlanta Section so as to include out-of-town members. It was also stated this was done in order to co-operate with the Society in its program of encouraging a larger participation in local activities. The President and Secretary of the Section were instructed to request the Board of Direction for permission to change the name of the Atlanta Section to the Georgia Section of the American Society of Civil Engineers.

On motion, this request was referred to the Committee on Local Sections for report.

**TWENTY-FIVE YEARS OF SERVICE WITH THE SOCIETY**

The Secretary reported that January 19, 1924, will be the twenty-fifth anniversary of the date on which Miss Matilda Steinbrenner joined the staff of the American Society of Civil Engineers as an Assistant in the Library. Since that time, she has served in various positions in the Library and Office and, at present, is Associate Editor. Her responsibilities include the editing of all copy, except technical editing, a great part of the correspondence connected with this work, the preparation of memoirs, and seeing *Proceedings* and *Transactions* through the press.

The Secretary reported that on July 31, 1924, Miss Ida Fredericks will have completed twenty-five years of service with the Society. She was first engaged as a typist in the Library at the time it was completely reclassified and recatalogued. Afterward, she was transferred to the office and has been advanced through various grades until she has attained her present position, that of Chief of Stenographers. Her duties include the abstracting of all applications for admission and for transfer, the signing of routine letters, oversight of much copy and stencil work, and the routine work of stenographers and typists in the General Office.

The Secretary reported that he could not speak too highly of the faithful and efficient work of these two members of the Staff and in recognition of their services recommended that a three months' leave of absence, with pay, be granted to each of them, to be taken at the convenience of the Secretary.

On motion, the Secretary's recommendation was adopted.

#### COMMITTEE ON STUDENT CHAPTERS

Chairman Marston, of the Committee on Student Chapters, presented the following report:

"January 15, 1924

#### "TO THE BOARD OF DIRECTION OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS:

"GENTLEMEN.—Your Committee on Student Chapters recommend that authority be granted to organize a Student Chapter of the American Society of Civil Engineers at the Missouri School of Mines and Metallurgy, Rolla, Mo.

"We request additional time in the cases of: University of Utah, Valparaiso University, and State College of Washington.

"The first two have not yet responded to our requests for data of the Institutions, and the application of the State College of Washington was received too late to obtain data as yet.

"We would report that inquiry has been made by William T. Lyle, Assoc. M. Am. Soc. C. E., head of the Department of Civil Engineering of Washington and Lee University, as to whether an application from that Institution will be acceptable. Unless there is objection unknown to us, the Chairman will write stating that application will be acceptable, provided that showing can be made of sufficient students to maintain a vigorous chapter.

"G. L. Wilson, M. Am. Soc. C. E., Minneapolis, Minn., writes stating that he is one of a Committee to formulate rules which shall govern the presentation of papers by members of the Student Chapter of the American Society of Civil Engineers at the University of Minnesota. Mr. Wilson inquires as to rules which may have been prepared on this subject. Your Committee is of the opinion that it is not wise to formulate such rules at the present time owing to the wide differences between conditions at different Institutions.

"Your Committee recommends that the Secretary be instructed to prepare for submission to the Board of Direction in due form an amendment to the By-Laws providing that authority granted for the organization of a Student Chapter at any Institution automatically shall lapse if not used within one year from the date granted.

"In the March, 1923, *Proceedings* of the American Society of Civil Engineers appears a paper by John L. Harrington, M. Am. Soc. C. E., read at the 1923 Annual Meeting, on the subject 'Co-operation of National Engineering Societies on Engineering Education', in which he severely criticises the present Student Chapter systems of the National Engineering Societies.

"He states that 'not only are the student branches failing measurably to serve the purpose for which they were organized, but they are doing their members a great injury'. Mr. Harrington thinks that 'as the Student Branches are organized by the Society and kept alive by the Faculty, the student's activities are limited and his benefits are proportionately small'. He claims that 'in establishing and fostering Student Chapters, each little group is set off by itself, and its interests are restricted to only one branch of engineering and to its own members'; that 'the eminent engineer with the broad message of interest is no longer invited to deliberate to all the students of an engineering school, but to one division of them, to a student branch.'

"Mr. Harrington recommends that the four Founder Societies abandon their present separate Student Chapters and substitute therefor, by united effort, a single chapter at each Engineering College composed of Engineering students of all kinds.

"On suggestion, your Committee has had a questionnaire on Student Chapters sent to each of the 63 sponsors of such Chapters in the American Society of Civil Engineers. We have had 39 replies and have devoted considerable study to them and to the whole subject. While sympathizing strongly with the idea of close co-operation at each Engineering College between all departmental engineering student societies (including the local Student Chapters of the Founder Societies), and while realizing that there are many shortcomings in existing engineering Student Societies, we are forced to conclude that Mr. Harrington's information as to the facts about the present Student Chapters must have been inadequate and to some extent misleading. We fear, also, that Mr. Harrington does not fully comprehend all the factors of the problem of Engineering Student Society organizations and management.

"Mr. Harrington's suggestion of a single engineering Student Society at each Engineering College already has been tried over and over, at many different colleges, and, in general, has failed at all colleges which have considerable numbers of students.

"In a single society, the numbers are so large that the interest of the average engineering student cannot be maintained because of lack of opportunity for much active Society work. All engineering students need training, which can be secured only by active participation in the affairs of an Engineering Society. Mere attendance is insufficient. The situation is quite different from that of membership in an Engineering Society after graduation.

"We find that a half century or more of experience with engineering student societies at engineering colleges gradually has developed systems of engineering student society organization at most large engineering colleges which are substantially alike in their essential features, as follows:

"A.—Separate departmental engineering student societies (Student Chapters so far as practicable) small enough to insure some training of every member in the Society activities. Every engineering student is eligible for membership during at least half of his four year course.

These departmental societies existed in large numbers before any Student Chapters were authorized and would continue if Student Chapters should be abolished.

"B.—A central Engineering Student Organization to co-ordinate the departmental societies, and in general to have charge of activities affecting the entire Engineering College.

In some engineering colleges, the central organization is a general engineering society, holding a few meetings per year. In others, there is a combined Engineering Societies organization, often formed of the officers of the separate departmental societies.\*

In its most advanced form, this central engineering student society organization essentially is an 'Engineering Council' composed of elected delegates. (In fact, some such student engineering councils were organized at least as early as the old Engineering Council of the Founder Societies.)

"About twenty engineering colleges have gone still further by making the central engineering student society organization at each institution a local

\* In small engineering colleges, the separate societies get together for joint meetings and other all-engineer functions without any formal organization.

chapter of the 'Association of Collegiate Engineers', which is a growing national organization.\*

"The general plan of engineering student society organization described above is a practicable outgrowth of actual experience, and functions well where fully developed; at least, it functions as well as reasonably can be expected of any plan dealing with technical societies the membership of which changes 100% every 2 to 4 years.

"We are not presenting a tabulation of replies to our questionnaire because we have definite answers from less than two-thirds of the sponsors of our American Society of Civil Engineers Student Chapters, and because so many answers are in the nature of discussions ranging from a paragraph to three or four pages in length. Thirty-two out of thirty-nine Institutions replying report active co-operation in different degrees between their Student Chapters.

"Twenty-eight out of thirty-nine replies express substantial disagreement with Mr. Harrington's views. Several of those twenty-eight indicated sympathy with some of Mr. Harrington's criticisms. All disagreed with his recommendation of a single Engineering Student Society at each Institution.

"Only six out of thirty-nine replies substantially agree with Mr. Harrington, and, in general, these represent small colleges.

"This leaves five replies classified as expressing divided opinion or no definite opinion.

"Your Committee recommend that the American Society of Civil Engineers continue to develop its present separate Student Chapter system, encouraging co-operation between its own Student Chapters, and those of other National Engineering Societies, but rejecting the suggestion of joint student chapters.

"We recommend a policy of active development and encouragement of our Student Chapters, with the object of increasing constantly their value to their members, to the Parent Society, to the Institution at which they are located, and to the Profession at large.

"Respectfully submitted,

"ARTHUR J. DYER

"EZRA B. WHITMAN

"ANSON MARSTON,

"Chairman."

On motion, the report was accepted and its recommendations were adopted.

Recess was taken at 12:30 P. M.

The Board reconvened at 2 P. M., with the same attendance as in the forenoon, except that Director Begien was absent and that Vice-President Davison was present.

#### COMMITTEE ON RESEARCH

Chairman Talbot, of the Committee on Research, presented the following report:

"NEW YORK, N. Y.,  
January 15, 1924

"TO THE BOARD OF DIRECTION

AMERICAN SOCIETY OF CIVIL ENGINEERS:

"On the matter of the appointment of a Special Committee on Cement, referred to the Committee on Research, the following report is presented:

\* The publication boards of the student engineering college journals, of about sixteen Engineering Colleges have united to form *Engineering College Magazines, Incorporated*, which also is a growing National organization.



"It is recommended that a Research Committee on Cement be constituted. The field of the Committee may well include the constitution, nature, and properties of cement, both as a material and as an ingredient in engineering construction, and the means of determining its quality for both general and specific purposes.

"In making this recommendation, the Committee desires to emphasize the need of making a study of the fundamentals relating to cements and their action. Notwithstanding that time has been given to its study, our knowledge of the chemical action of cements is very inadequate, and no great progress is being made. The composition of cements is quite diverse, the chemical action of setting and hardening under different conditions and the nature of the resulting compounds are varied and complex, and the resulting products may differ markedly in strength and durability qualities. It is apparent that a thorough and systematic chemical, physical, and petrographic study of the action of cement should furnish information of the greatest value, knowledge that is essential to a proper consideration of the qualities that may reasonably be expected or required in this construction material and helpful in a consideration of the proper or allowable methods in its use. Such a study would be only one part of the work of a committee. Although Portland cement is the principal material to be considered, other cements would naturally be included in the work. It is expected that the Committee would deal with cement rather than with mortar and concrete, although, of course, the scope should include the action of the cement and its resulting properties for all the various conditions to be found in mortar and concrete and all matters relating to the durability and permanency of construction as affected by the nature and use of the cement. Such conditions as amount of water used, both mixing water and water retained, exposure, expansion and contraction, and changes in moisture content would seem to be involved in the investigation. The chemical reactions and the physical changes under a variety of conditions with cements of diverse composition would need to be studied. Naturally, the Committee should try to learn whether tests of cement specified at present are conclusive and sufficient tests and whether other forms of tests may well supplant any of the present ones. This enumeration is not intended to fix or limit the scope of the Committee's work, but to suggest something of the field. It is not the thought, however, that the Committee would report on proper and improper methods of proportioning, making, and placing concrete, this subject being one that might well be assigned to an engineering practice committee.

"It is evident that an adequate investigation of this subject will be an undertaking of some magnitude. It should be taken up in a way that will result in the greatest good for all interests. These interests include the engineer, the user of cement (there being a great variety of consumers, from the largest public works and large private construction work to the small user, as well as contractors of all grades), the cement manufacturer, and the scientific investigator. It is believed that the U. S. Bureau of Standards would be interested in the investigation and that important assistance would be given by it. Certain college and experiment station laboratories would give service, and also other laboratories such as those on large public works. It is known that the Portland Cement Association has established a fund and started work along this same line and it is hoped that it will willingly co-operate, which, of course, would be extremely desirable. It would be expected that funds for the investigation may be obtained from both public and private sources.

"As the nature of this investigation is different from other research problems undertaken by committees of the Society, it seems advisable to break away from the practice of the Society and to include in the membership of the Committee men who are not members of the Society. On this Committee may well be chemists or others who are well versed in processes of manufacture and the nature of the chemical and physical processes involved in the

setting and hardening of cement. It would seem advisable also to include representatives of the manufacturers, since the problem is one of mutual interest. Such a selection may be expected to add greatly to the thoroughness and applicability of the investigation and to make the results more constructive and convincing. The Committee on Research recommends that this procedure be followed.

"The Committee believes that an investigation of the kind may be expected to bring results of great interest and importance to engineers, construction interests, and the public generally.

"Respectfully submitted,

"The Committee on Research,

"By A. N. TALBOT,

"Chairman."

On motion, the President was authorized to appoint the Committee on Cement.

Chairman Talbot then recounted the activities during the year on the various research committees of the Society, under the supervision of his Committee on Research.

The President announced that the Committee's report of progress was received with thanks.

#### COMMITTEE ON LOCAL SECTIONS

Chairman Humphrey, of the Committee on Local Sections, presented a report, copies of which were distributed to the members present.

Director Humphrey read each of the recommendations contained in the report of his Committee, which were acted on separately.

The first recommendation was adopted:

"That the Chairman of the Committee on Local Sections of this Society be authorized to participate in a conference with the Chairmen of similar committees of the other Founder Societies, for the purpose of considering ways and means, whereby a closer co-operation with the Local Sections of the Founder Societies in various parts of the country may be secured, and that mileage is to be allowed for such attendance."

It was moved and seconded that the second recommendation of the Committee: "That, for the purpose of administration, each member of the Society, including foreign members, in the absence of a voluntary choice shall be assigned to a Local Section by the Board of Direction," be approved.

A roll call was taken on this motion, which was lost by a vote of 7 "ayes" and 15 "noes" as follows:

"Ayes" (7): Messrs. Chester, Dyer, Fenkell, Freeman, Humphrey, Marston, and Whitman.

"Noes" (15): Messrs. Brown, Condron, Curtis, Darrow, Davison, Grunsky, Hogan, Holmes, Huber, Loweth, Mason, Ridgway, Talbot, Winsor, and Yates.

It was moved that the third recommendation of the Committee, be approved:

"That for the present a limitation be not placed on the expenditures of the funds allotted to Local Sections; and that there shall be an annual accounting to the Board of Direction of the expenditures of the allotted funds and that the unexpended balance of such funds shall apply to the allotment for the ensuing year."

After discussion, the motion was amended and the President then re-stated the amended motion, as follows, which was carried by an "aye" and "no" vote:

"That for the present a limitation be not placed on the expenditures of the funds allotted to Local Sections; and that there shall be an annual accounting to the Board of Direction of the expenditures of each Local Section."

It was moved that the fourth recommendation of the Committee, be approved:

"That before a Local Section undertakes the publication of a bulletin that it secure the approval of the Board of Direction; that two copies of each issue shall be sent to the Secretary of the Society, one to be critically examined by him and the other to be sent to the Committee on Local Sections; such bulletins shall maintain a high standard and be free from matter detrimental to the interests of the Society."

After discussion, the motion was finally adopted in the following form:

"That when a Local Section undertakes the publication of a bulletin that two copies of each issue shall be sent to the Secretary of the Society, one to be examined by him and the other to be sent to the Committee on Local Sections; such bulletins shall maintain a high standard and be free from matter detrimental to the interests of the Society."

On motion, the fifth recommendation of the Committee was approved, as follows:

"That each Local Section be urged to establish a close affiliation with Student Chapters in its territory; that each Section arrange for the attendance of its members at meetings of the Local Student Chapters and for the attendance of members of such Chapters at its meetings and excursions."

Director Humphrey stated that the sixth recommendation of the Committee was:

"Your Committee recommends an Annual Conference of Representatives of Local Sections, the Conference to determine the time and place of such meetings."

On motion, the foregoing recommendation was adopted by a show of hands, resulting in 12 "ayes" and 9 "noes."

Director Humphrey stated that the seventh recommendation of the Committee was:

"That one representatives from each Local Section each year be allowed mileage one way at the rate of 5 cents per mile of the difference between the headquarters of the Local Section he represents and the place of the conference." (Meaning the Annual Conference of Representatives of Local Sections mentioned in the Sixth Recommendation of the Committee.)

This recommendation was lost by a roll-call vote of 4 "ayes" and 18 "noes," as follows:

"Ayes" (4): Messrs. Fenkell, Freeman, Humphrey, and Whitman.

"Noes" (18): Messrs. Brown, Chester, Condron, Curtis, Darrow, Davison, Dyer, Grunsky, Hogan, Holmes, Huber, Loweth, Marston, Mason, Ridgway, Talbot, Winsor, and Yates.

(Past-President Webster came in at this point, but did not vote.)

Director Humphrey stated the eighth recommendation of the Committee, as follows:

"That definite boundaries for the Local Sections be fixed by the Board of Direction on the recommendation of the Committee on Local Sections and that thereafter no new Constitutions for Local Sections or amendments of Constitutions changing such boundaries be approved by the Board, until it has had the report of the Committee on Local Sections on the proposed boundaries of the Local Sections."

On motion, this recommendation was adopted by an "aye" and "no" vote.

After discussion the following motions were adopted:

"That the report of the Committee on Local Sections with the appended summary of the replies by the Local Sections to the questionnaire be multi-graphed and copies sent to each member of the Board of Direction and to the President and to the Secretary of each Local Section."

"That the action of the Board in regard to the report of the Committee on Local Sections be printed in the *Proceedings* in the same manner as other business transacted by the Board."

#### SUGGESTED AMENDMENT TO ARTICLE V, SECTION 1, OF THE BY-LAWS

Vice-President Marston stated he would offer the following amendment which will come up for final action at the next meeting of the Board:

Insert the following as the second sentence in Section 1, Article V, of the By-Laws:

"Authority granted for the organization of a Student Chapter at any institution shall automatically lapse if not used within one year from the date granted."

#### COMMITTEE ON REGISTRATION OF ENGINEERS

Chairman Humphrey, of the Committee on Registration of Engineers, presented a report, which was received, and the Committee was discharged with thanks.

On motion, the question of publication of the information collected by the Committee was deferred for consideration by the incoming Board.

#### SOCIÉTÉ HYDROTECHNIQUE DE FRANCE

It was reported that the Société Hydrotechnique de France had written to the Society under date of December 7, 1923, explaining that that Société is conducting an investigation of hydro-electric plants and has prepared questionnaires, copies of which were furnished. It is stated that if the result of the investigation warrants it, they will be published and distributed to the plants which supplied answers to the questionnaires.

On motion, this matter was referred to the Power Division for report to the Executive Committee, the Executive Committee being granted power to act.

#### COMMITTEE ON RE-ARRANGEMENT OF THE 15TH FLOOR

Chairman Humphrey of the Committee on Re-arrangement of the 15th Floor, presented a final report.

On motion, this report was received, and the Committee was discharged with thanks.



## COMMITTEE ON TECHNICAL ACTIVITIES AND PUBLICATIONS

Chairman Humphrey, of the Committee on Technical Activities and Publications, presented the following report:

"January 15, 1924

## "TO THE BOARD OF DIRECTION

## AMERICAN SOCIETY OF CIVIL ENGINEERS:

"GENTLEMEN:—Your Committee on Technical Activities and Publications recommends that the following dates for future meetings of the Society be approved by the Board:

## "(a) Spring Meeting:

Atlanta, Ga. .... April 9-12, 1924

(Board Meeting, April 7-8, 1924)

## "(b) Annual Convention:

Pasadena, Calif. .... June 18-20, 1924

(Board Meeting, June 16-17, 1924)

## "(c) Fall Meeting:

Detroit, Mich. .... October 23-25, 1924

(Board Meeting, October 21-22, 1924)

## "(d) Spring Meeting:

Kansas City, Mo. .... 1926

"Your Committee reports that it is unable to submit the survey and estimate of the probable income from advertising requested by the Board.

"Your Committee has met at least once each month during the year, and its Chairman has been in frequent consultation with the Secretary as to matters under its jurisdiction.

"The following table shows the increase in number of pages of publications since 1919:

Year.	Proceedings.	Transactions.	Total pages.	Illustrations.
1919	2 096	1 775	3 871	821
1920	2 014	1 775	3 789	417
1921	1 834	3 472*	5 306	966
1922	2 684	1 842	4 526	748
1923	3 210	1 808	5 018	897

\* Vol. LXXXIII and LXXXIV.

"The slight increase in cost per page of publications is due to the increase in the number of illustrations and tabular matter.

"Respectfully submitted,

"J. N. CHESTER

C. E. GRUNSKY

JOHN P. HOGAN

J. J. YATES

RICHARD L. HUMPHREY,

"Chairman."

On motion, the report of the Committee was adopted.

## SUGGESTED AMENDMENTS TO ARTICLE IV, OF THE BY-LAWS

Director Hogan stated that he would offer the following amendments which will come up for final action at the next meeting of the Board:

Change Article IV, Section 1, fourth paragraph, of the By-Laws from "A Committee on Technical Activities and Publications" to two Committees, namely, "A Committee on Technical Activities and Meetings" and "A Committee on Publications."

Change Section 4 to:

"4.—The Committee on Technical Activities and Meetings shall consist of five members, at least one being a member of the Board of Direction. It shall be charged with the promotion of the technical interests and the stimulation of the activities of the Society in technical and professional matters. It shall have charge of the arrangements for technical and general meetings of the Society, and shall co-ordinate the programs of the technical divisions with those of the general sessions. It shall have power to accept and order printed in pamphlet form, the papers to be presented at meetings, but shall not have the power to accept any paper for publication in the *Proceedings* or *Transactions* of the Society. In addition to the regular membership of the Committee on Technical Activities and Meetings, advisory sub-committees may be appointed by the Local Sections of the Society."

Add new Section 5 as follows:

"5.—The Committee on Publications shall consist of five members, at least one being a member of the Board of Direction. It shall have power to accept and order printed all papers to be published in the *Proceedings* and *Transactions* of the Society. It shall have general supervision of the publications of the Society and of the performance of contracts and expenditures connected therewith, and shall be authorized to make general rules for the preparation and presentation of papers."

Re-number present Sections 5, 6, and 7, as Sections 6, 7, and 8, respectively.

Adjourned at 5:45 p. m.

January 17, 1924.—The Board met at 9:00 A. M., at the Headquarters of the Society, at the time of the Annual Meeting, as required by the Constitution; President C. E. Grunsky in the chair; John H. Dunlap, Secretary; and present, also, Messrs. Brown, Chester (came in at 9:13 A. M.), Condron, Curtis, Davison, Dyer, Farnham, Fenkell, Freeman, Holland, Holmes, Howe (came in at 9:10 A. M.), Huber, Loweth, Marston, Mason, Merriman, Ridgway, Webster (came in at 9:45 A. M.), Winsor, and Yates.

## STANDING COMMITTEES OF THE BOARD

President Grunsky addressed the Board concerning the appointment of its Standing Committees, announcing that he would submit a suggested personnel for its approval, and invited suggestions. After discussion, and some slight change, the President recommended the following personnel for the approval of the Board:

*Executive Committee:* Charles F. Loweth, *Chairman*, Lincoln Bush, *Vice-Chairman*, Clifford M. Holland, George S. Webster, and Frank E. Winsor.

*On Technical Activities and Publications:* J. J. Yates, *Chairman*, Thaddeus Merriman, *Vice-Chairman*, John N. Chester, Glenn D. Holmes, and Ezra B. Whitman.

*Public Relations Committee:* Walter L. Huber (Zone 4), *Chairman*, R. N. Begien (Zone 3), John R. Freeman (Zone 1), Charles F. Loweth,\* and George S. Webster (Zone 2).

*Committee on Local Sections:* George H. Fenkell, *Chairman*, A. O. Ridgway, and J. M. Howe.

*Committee on Professional Conduct:* John R. Freeman, *Chairman*, George S. Davison, and T. L. Condron.

*Committee on Student Chapters:* Anson Marston, *Chairman*, A. J. Dyer, and George C. Mason.

On motion, these Committees were unanimously approved.

#### JOINT CONFERENCE COMMITTEE

President Grunsky announced that he would ask Past-President Loweth to act as his alternate on the Joint Conference Committee, which consists of the Presidents and Secretaries of the four Founder Societies.

#### COMMITTEE ON REGISTRATION OF ENGINEERS

It was reported that the Board at its meeting of October 15, 1923, adopted a resolution authorizing the President to appoint a Standing Committee on Registration of Engineers, at least one of which shall be a member of the Board of Direction; that the duties of this Committee shall be:

(1) To keep this Society informed as to the progress of registration or licensing of engineers.

(2) To draft a registration law for professional engineers and land surveyors for approval by the Board of Direction.

(3) To keep in touch with Local Sections of this Society, lending assistance in securing the adoption of the approved draft of a law where registration of this character is proposed by a State Legislature.

(The report of the former Committee on Registration of Engineers was received by the Board at its meeting of January 15, 1924, and the Committee was discharged with thanks.)

On motion, it was voted that the new Committee to be appointed on the Registration of Engineers, be a Committee confined to this Board.

After discussion, Director Condron was appointed Chairman of the new Committee and, on motion, the President was authorized to name the other members of the Committee. (The President subsequently stated he would confer with Chairman Condron in this matter.)

#### 1924 BUDGET

The proposed Budget for 1924,† recommended by the outgoing Board to this Board for adoption, was considered.

On motion, this Budget was adopted.

\* Past-President Loweth subsequently asked to be relieved, and Vice-President Marston has been appointed on the Public Relations Committee as the member-at-large from the Board.

† See p. 185.

SPECIAL COMMITTEE ON IMPACT IN HIGHWAY BRIDGES AUTHORIZED TO PURCHASE  
SPECIAL INSTRUMENT

Vice-President Marston stated that the Committee on Impact in Highway Bridges was desirous of purchasing a U. S. Bureau of Standards' instrument at a cost of approximately \$2 800, which would be most valuable to the work of the Committee.

On motion, the appropriation of \$2 800 was approved for the purchase of the instrument described.

COMMITTEE ON HONORARY MEMBERSHIP

As the personnel of the Committee on Honorary Membership is automatically composed of the five latest living Past-Presidents, the President, and the four Vice-Presidents, the Committee for 1924 will be as follows: Messrs. C. E. Grunsky, Oscar Bowen, Lincoln Bush, F. S. Curtis, A. P. Davis, George S. Davison, John R. Freeman, Charles F. Lowth, Anson Marston, and George S. Webster.

On motion, the Committee on Honorary Membership was empowered to elect its own Chairman.

PUBLICATION OF DATA ACCOMPANYING REPORT OF THE COMMITTEE ON  
REGISTRATION OF ENGINEERS

The outgoing Board at its meeting of January 15, 1924, referred to this Board the question of the publication of certain data which accompanied the report of the Committee on Registration of Engineers.

The last paragraph of the report of the Committee in question reads:

"Your Committee recommends that the appended report of its hearings, abstract of replies to the questionnaire on the operation of registration or licensing laws in the various States, status of registration or licensing laws in this country, the summary of the replies to the questionnaire issued by your Committee to the principal Engineering Societies of the world, as well as to the members of the Society in other countries, and the excerpt from its report of September 29, 1923, giving the distribution of membership in the Founder Societies in 1923, and of all engineers in the United States as given by the 1920 census, be made available in pamphlet form for the information of the members of the Society."

On motion, it was decided to refer this matter to the Committee on Technical Activities and Publications, with instructions to report back to the Board.

FEDERAL RE-ORGANIZATION

The President gave the history of the question of Federal Re-organization, which had been referred to this Board by the outgoing Board of Direction.

On motion, this matter was referred to the Public Relations Committee with power to appoint sub-committees as may be necessary from time to time.

On motion, the former Committee on Federal Re-organization, consisting of Messrs. Loweth, Chevalier, Markwart, Metcalf, and Paul, was discharged.

CENTRAL ILLINOIS SECTION

It was reported that C. C. Williams, M. Am. Soc. C. E., of Urbana, Ill., under date of January 14, 1924, forwarded a petition to the Board of Direc-



tion signed by thirty-seven members for the formation of a Central Illinois Section of the Society with headquarters in Urbana-Champaign. A proposed Constitution with rules and by-laws has also been received.

The Secretary reported that he has examined this Constitution and that it is in correct form.

After discussion the Constitution of the Central Illinois Section was approved and the formation of such Section was authorized, the matter of boundaries being referred to the Committee on Local Sections.

#### REPORTS OF SPECIAL COMMITTEES RECEIVED BY ANNUAL MEETING

##### AND REFERRED TO BOARD.

The Secretary reported that the Annual Meeting on January 16, 1924, had received the reports presented by the Special Committees of the Society and had referred them to the Board of Direction with power.

On motion, the Special Committee on Highway Engineering was discharged, as recommended.

On motion, the reports of the other Special Committees were referred to the Executive Committee with power to act on the various recommendations made.

#### SUGGESTED DATES FOR FUTURE BOARD MEETINGS

The following dates were suggested for meetings of the Board of Direction during 1924:

Monday, February 25, 1924, at 7 P. M., at Society Headquarters.—Intermediate Board Meeting.

April 7-8, 1924, Atlanta, Ga.—Quarterly Board Meeting preceding the Spring Meeting to be held in Atlanta, April 9-12, 1924.

Monday, May 19, 1924, at 7 P. M., at Society Headquarters.—Intermediate Board Meeting.

June 16-17, 1924, Pasadena, Calif.—Quarterly Board Meeting preceding the Annual Convention in Pasadena, June 18-20, 1924.

October 21-22, 1924, Ann Arbor, Mich.—Quarterly Board Meeting preceding the Fall Meeting in Detroit, Mich., October 23-25, 1924.

On motion, the foregoing dates were adopted, and the Executive Committee was given power to fix the dates for any necessary Intermediate Board Meetings for the consideration of applications.

#### REPORT OF COMMITTEE ON LOCAL SECTIONS TO BE EDITED BY

##### NEW COMMITTEE ON LOCAL SECTIONS

The Board, at its meeting of January 15, 1924, authorized copies of the report of the Committee on Local Sections, with appended summary, to be sent to each member of the Board and to the President and Secretary of each Local Section. (It was also decided that the action of the Board in regard to the report was to be printed in *Proceedings* in the same manner as other business transacted by the Board.)

After discussion it was decided, on motion, to send the report of the Committee on Local Sections, after editing by the new Committee on Local

Sections, to each member of the Board, and to the Presidents and Secretaries of all Local Sections.

#### BONUS BILL AND PEACE PLAN REFERRED TO PUBLIC RELATIONS COMMITTEE

On the suggestion of former Chairman Brown, of the Public Relations Committee, the Bonus Bill and the Peace Plan were referred to that Committee as possible matters to be considered.

Adjourned at 11:00 A. M. to meet at 7:00 P. M., February 25, 1924, at Society Headquarters, for the consideration of applications for membership about which there is no question, and to meet at Atlanta, Ga., at 10:00 A. M., April 7, 1924, this being the regular Quarterly Meeting of the Board.

### OF THE EXECUTIVE COMMITTEE

This is an abstract of the notes of the Secretary and subject to approval by the Board of Direction at its next meeting.

**January 17, 1924.**—The Executive Committee met about 11:30 A. M.; Past-President Charles F. Loweth in the chair; John H. Dunlap, Secretary; and present, also, Messrs. Holland, Webster, Winsor, and Treasurer Hovey.

The minutes of the December 12, 1923, meeting of this Committee, and the supplement thereto, were approved by the Board of Direction at its meeting on January 14, 1924.

#### APPORTIONMENT OF 1924 BUDGET APPROPRIATION MADE FOR WORK OF SPECIAL COMMITTEES

The apportioning of the sum of \$11 500 in the Budget adopted by the Board for the work of Special Committees for 1924 was considered, together with the requests of the various Committees and, after consideration, the following sums were apportioned:

Committee.	Allotment.
To Codify Present Practice on the Bearing Value of Soils for Foundations.....	\$250
On Bridge Design and Construction.....	750
On Standard Construction Contracts.....	250
On Electrification of Steam Railways.....	250
On Flood-Protection Data.....	375
On Hydraulics Phenomena.....	500
On Impact in Highway Bridges.....	3 100*
On Irrigation Hydraulics.....	1 500
On Stresses in Structural Steel.....	1 000
American Engineering Standards Committee.....	1 750
On Effects of Earthquakes on Engineering Structures with Special Reference to the Japanese Earthquake of September 1, 1923.....	250
Society's Representatives on Joint Committee on Concrete and Reinforced Concrete.....	500
	<b>\$10 475</b>

\* Includes \$2 800 for purchase of instrument authorized by Board of Direction at its meeting of January 17, 1924.

The financing of the Special Committees on Concrete and Reinforced Concrete Arches and on Steel Column Research by Engineering Foundation, was discussed. The Secretary was instructed to write to the Committees that have requested appropriations for 1924 (with the exception of the Special Committees on Concrete and Reinforced Concrete Arches and on Steel Column Research) stating that the Society is able at present to allot only a part of the amount requested, but it is hoped later to be able to advise them of a larger allotment, as this Committee is considering the possibility of raising outside funds and would welcome suggestions.

The Special Committees on Concrete and Reinforced Concrete Arches and Steel Column Research are to be informed that the Society is largely dependent at this time on Engineering Foundation for the financial aid required by these Committees and that it is expected this aid will be forthcoming and it is hoped to be able soon to advise them definitely.

#### ALLOTMENTS TO TECHNICAL DIVISIONS

Requests for allotments for 1924 to the various Technical Divisions were considered and the following tentative apportionments were made of the appropriation of \$3 000 by the Board of Direction. (As the City Planning Division is to send a statement of its needs for 1924, this matter will be again considered by this Committee at a later meeting.)

Sanitary Engineering Division.....	\$750
Highway Engineering Division.....	750
Power Division .....	750
Irrigation Engineering Division .....	400
City Planning Division.....	300

#### REPORTS OF SPECIAL COMMITTEES RECEIVED BY ANNUAL MEETING

The Annual Meeting on January 16, 1924, received the reports presented by the Special Committees of the Society and referred them to the Board of Direction with power. The Board at its meeting of January 17, 1924, discharged the Special Committee on Highway Engineering, as recommended, and referred the reports of the other Special Committee to this Committee with power.

On motion, the Special Committee on Fire Prevention of Docks, Wharves, and Piers was discharged with thanks.

Copies of all the reports will be forwarded to the Research Committee and any recommendations therein will be brought later to the attention of the Executive Committee.

Adjourned at 1:15 P. M.

#### OF THE TECHNICAL DIVISIONS

##### Power Division

(Abstract)

##### Morning Session

**January 17, 1924.**—A meeting of the Power Division was called to order at the Engineering Societies Building, New York, N. Y., at 10:40 A. M.; Mr. George A. Orrok presiding; and present, also, about 110 members and guests.

The revised Constitution of the Division which was presented by Mr. Edward Hutchins, was read and discussed by paragraphs, and, on motion, duly seconded, was adopted.

The Secretary presented the report of the Tellers on the vote for members of the Executive Committee for 1924. This Committee will consist of Messrs. N. C. Grover, George A. Orrok, Arthur P. Davis, Charles T. Main, and Daniel W. Mead.

The Secretary presented a copy of the translation of a letter dated December 28, 1923, addressed to the Board of Direction, from the Hydro-Technical Society of France relative to a proposed study of the problems arising from the silting of certain navigation canals and the channels of low-head hydro-electric plants, which letter was referred to the Power Division by the Board of Direction for report. The Secretary also presented a letter from Mr. John P. Hogan, relative to this subject. The question was discussed by Messrs. John R. Freeman, and N. C. Grover and, on motion, duly seconded, the matter was referred to the incoming Executive Committee for action.

The Annual Report\* of the Division for 1923, was presented by the Secretary.

Chairman Orrok introduced C. M. Allen, M. Am. Soc. C. E., who presented a paper entitled "Comparative Tests on Experimental Draft-Tubes",† by himself and I. A. Winter, Esq., illustrating his remarks with lantern slides.

Mr. Winter followed Mr. Allen with a detailed discussion of the results obtained from the tests, also illustrating his remarks with lantern slides, and the subject was discussed by Messrs. William J. Rheingans, Lewis F. Moody, H. Birchard Taylor, John R. Freeman, Clemens Herschel, F. W. Scheidenhelm, Richard A. Hale, and the authors.

Written discussions on the subject were announced as having been received from Messrs. H. A. Hageman, C. P. Dunn, C. M. Weston, and Lynn Perry.

Adjourned at 1:00 P. M., to reconvene at 2:40 P. M.

#### Afternoon Session

**January 17, 1924.**—The meeting of the Power Division reconvened at 2:40 P. M.; Mr. George A. Orrok, presiding; and present, also, about 60 members and guests.

An informal discussion on "Absorption of Hydro-Electric Power by Existing Systems", was opened by Mr. John P. Hogan who illustrated his remarks with lantern slides. Mr. Hogan was followed by Mr. William B. Jackson who also showed slides to illustrate his remarks, and the subject was discussed by Messrs. E. W. Maloney, George A. Orrok, W. S. Pardoe, F. W. Scheidenhelm, F. C. Shenehon, and Mr. Jackson.

Adjourned.

#### Sanitary Engineering Division

(Abstracts)

**January 15, 1924.**—A meeting of the Executive Committee of the Sanitary Engineering Division was held at the Hotel McAlpin, New York, N. Y., at

\* See p. 247.

† *Proceedings*, Am. Soc. C. E., November, 1923, Papers and Discussions, p. 1813.



which the following members were present: Messrs. Kenneth Allen, *Chairman*, J. Frederick Jackson, and George T. Hammond.

Chairman Allen presented a financial statement of the Division for 1923 and suggested the advisability of adopting the practice of having the accounts audited. It was decided that the Chairman should appoint three members of the Division for this purpose, subject to the approval of the Secretary of the Society, which may also audit the books.

The appointment of Messrs. C. E. Grunsky, R. V. Orbison, W. T. Knowlton, and C. G. Gillespie as members of a Local Committee of Arrangements for the meeting of the Division to be held during the Annual Convention of the Society at Pasadena, Calif., in June, 1924, leaving the appointment of the Chairman and a fifth member to the incoming Executive Committee, was approved.

The report of the Tellers on the ballots for members of the new Executive Committee was received.

Chairman Allen reported the receipt of \$1 512.72 toward the Rudolph Hering Medal Fund, all of which except \$10.00 had been paid in to the Secretary of the Society. It was suggested that the incoming Executive Committee appoint a "Medal Committee" to plan the necessary details and to supervise the production and award of the Medal.

It was also suggested that the practice of having an Annual Address be continued and that if this address was not delivered by a member of the Executive Committee or an officer of the Society, the speaker's expenses be paid from the funds of the Division.

The necessary plans to be taken to participate in the International Conference of Sanitary Engineers to be held in England during the summer of 1924, were referred to the incoming Executive Committee.

A letter from Mr. R. V. Orbison suggesting closer relations between the main body of the Division and the members on the Pacific Coast, was read by the Chairman and referred to the incoming Executive Committee.

A draft of the Annual Report of the Executive Committee for 1923 was read by Chairman Allen and, on motion, duly seconded, was approved and signed by those present.

#### Morning Session

**January 17, 1924.**—The meeting was called to order at 10:15 A. M., at the Engineering Societies Building, New York, N. Y.; Chairman Kenneth Allen presiding; and present, also, about 102 members and guests.

Chairman Allen presented the Annual Report of the Executive Committee\* of the Division for 1923.

Mr. Samuel A. Greeley presented a report on the Rudolph Hering Medal, and, after discussion of the subject by Messrs. George T. Hammond, T. Chalkley Hatton, Leonard Metcalf, and Mr. Greeley, on motion, duly seconded and carried, the Chairman was instructed to forward a notice of the status of the Rudolph Hering Medal Fund to each member of the Division, with a request for voluntary contributions.

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\* See p. 249.

Chairman Allen read the conditions of the award of the Rudolph Hering Medal,\* as prepared by the Executive Committee of the Division, and, on motion, duly seconded and carried, these conditions were adopted by the meeting.

After discussion by Messrs. Sackett, Gregory, Greeley, and Hammond, the resolution† prepared by the Committee on the Status of the Sanitary Engineers of the U. S. Public Health Service, was, on motion, duly seconded and carried, adopted by the meeting.

A communication from the Institution of Sanitary Engineers relative to the Conference on Sanitation to be held in England during the week beginning June 2, 1924, was presented by Mr. T. Chalkley Hatton.

Relative to the programs of the Division at the Quarterly Meetings of the Society, Chairman Allen stated that he had appointed Messrs. R. V. Orbison, W. T. Knowlton, C. G. Gillespie, and C. E. Grunsky, as a Local Committee of Arrangements for the meeting of the Division to be held during the Annual Convention of the Society at Pasadena, Calif., in June, 1924.

Announcements relative to the afternoon excursions and the Budget of the Division for 1924 were made by the Chairman, who also reported the result of the letter-ballot for officers of the Division for 1924.

On motion, duly seconded, a committee was appointed to audit the books of the Division.

A circular from the Secretary of the Anti-Pollution League was presented by the Chairman, and after a discussion of the work of the League by Messrs. Rankin, Saville, and the Chairman, a resolution referring the matter of the pollution of coastal waters to the Executive Committee for action, was adopted.

On motion, duly seconded, the Executive Committee was instructed to appoint a committee to co-operate with the Committee of the American Public Health Association appointed to formulate definitions applying to Public Health Work.

The report of the Committee on "Friction of Sludge"‡ was presented by Mr. Glenn D. Holmes, and, on motion, duly seconded, accepted by the meeting.

Mr. C. G. Wigley presented the report on the New Jersey State Sewage Experiment Station,§ which, on motion, duly seconded, was accepted.

Adjourned at 12 m. to meet again at 2:15 p. m.

#### Joint Meeting with the New York Section of the American Water Works Association

**January 17, 1924.**—A Joint Meeting of the New York Section of the American Water Works Association and the Sanitary Engineering Division was held at the Hotel Pennsylvania, New York, N. Y., at 12:30 p. m.; G. W. French, Superintendent of the Hackensack, N. J., Water Company, in the chair; and present, also about 200 members and guests.

\* *Proceedings*, Am. Soc. C. E., December, 1923, p. 697.

† See p. 192.

‡ See p. 258.

§ See p. 255.

Chairman French introduced Kenneth Allen, Chairman of the Sanitary Engineering Division, who addressed the meeting briefly.

A paper entitled, "The Practice of Double Filtration of Water in Europe", was presented by George W. Fuller, M. Am. Soc. C. E., and the subject was discussed by Messrs. P. A. Maignen, Allen Hazen, and Sol Pineus.

Adjourned.

#### Afternoon Session

**January 17, 1924.**—The meeting of the Sanitary Engineering Division was reconvened at 2:15 P. M., at the Engineering Societies Building, New York, N. Y.; Chairman Kenneth Allen presiding; and present, also, about 60 members and guests.

Chairman Allen introduced Frank A. Marston, M. Am. Soc. C. E., who presented a paper entitled "Distribution of Intense Rainfall and Some Other Factors in the Design of Storm-Water Drains".\* The subject was discussed by Messrs. George T. Hammond and L. L. Tribus, and the Chairman.

On motion, duly seconded and carried, a discussion on the subject by Mr. Adolph F. Meyer was read by title only.

The Symposium on "Imhoff Tanks—Comparison of Operating Results", was opened by Mr. Leonard Metcalf, who presented the paper on the subject by Mr. Harrison P. Eddy, and the subject was discussed by Messrs. George T. Hammond, John F. Skinner, who illustrated his remarks with lantern slides, and John R. Downes, who also illustrated his discussion with lantern slides.

Adjourned.

#### Highway Division

(Abstracts)

##### Morning Session

**Thursday, January 17, 1924.**—The Annual Meeting of the Highway Division was called to order in the Engineering Societies Building, New York, N. Y., at 11:00 A. M.; Mr. C. D. Curtiss presiding; and present, also, about 75 members and guests.

Chairman Curtiss presented the Annual Report† of the Division for 1923.

A paper by A. T. Goldbeck, Assoc. M. Am. Soc. C. E., entitled "Researches of the U. S. Bureau of Public Roads on the Structural Design of Highways", was presented by the author who illustrated his remarks with lantern slides. The subject was discussed orally by Messrs. L. F. Peck, R. A. MacGregor, Prévost Hubbard, Alexander Blair, and the author.

Adjourned at 1:00 P. M. to meet at 2:45 P. M.

##### Afternoon Session

**Thursday, January 17, 1924.**—The Annual Meeting of the Highway Division was reconvened at 2:45 P. M.; Mr. C. D. Curtiss presiding; and present, also, about 35 members and guests.

\* *Proceedings*, Am. Soc. C. E., January, 1924, Papers and Discussions, p. 19.

† See p. 252

Chairman Curtiss introduced H. Eltinge Breed, M. Am. Soc. C. E., who presented a paper by Clifford Older, M. Am. Soc. C. E., entitled "Highway Research in Illinois",\* illustrating his remarks with lantern slides.

A general discussion of the future activities of the Division was participated in by Messrs. J. C. Carpenter, L. N. Whitcraft, H. Eltinge Breed, and the Chairman.

Adjourned.

**January 23, 1924.**—A meeting of the Executive Committee of the Highway Division was held at the Cosmos Club, Washington, D. C., at which the following members were present: Messrs. H. G. Shirley, W. K. Hatt, and C. D. Curtiss.

The first business of the meeting was the organization of the new Executive Committee of which Mr. Shirley was elected Chairman and Mr. Curtiss Secretary.

The matter of holding meetings of the Division at the time of the Quarterly Meetings of the Society in 1924, was discussed in detail, and tentative programs for the meetings to be held at Atlanta, Ga., Pasadena, Calif., and Detroit, Mich., were adopted.

The question of holding a meeting of the Division in connection with the Annual Meeting of the Society in January, 1925, was also discussed and was considered to be desirable, providing a conflict with the meeting of the American Road Builders Association could be avoided. A tentative program was also discussed for the proposed meeting.

### City Planning Division

(Abstract)

#### Morning Session

**January 17, 1924.**—The Annual Meeting of the City Planning Division was called to order at the Engineering Societies Building, New York, N. Y., at 10:00 A. M.; Nelson P. Lewis, Chairman of the Executive Committee, presiding; C. B. Ball, Secretary; and present, also, about 15 members and guests.

The minutes of the organization meeting of the Division held on July 12, 1923, were approved as published.†

The Annual Report‡ of the Division was presented by Chairman Lewis, and approved.

The proposed Constitution of the Division was presented, section by section, and, after discussion, was adopted with minor alterations.

The desirability of organizing certain committees in order to further the work of the Division was also considered, and, on motion, duly seconded, the Chairman was authorized to appoint three committees on City Planning Legislation, Status of Zoning, and City Planning Publications.

Relative to the International Engineering Congress to be held in Philadelphia, Pa., in 1926, Chairman Lewis was requested to advise organizations

\* *Proceedings*, Am. Soc. C. E., February, 1924, Papers and Discussions, p. 175.

† *Proceedings*, Am. Soc. C. E., September, 1923, p. 524.

‡ See p. 253.



that might engage in forwarding this Congress, the desire of the Division to co-operate in the preparation of a program for it and possibly in inviting foreign societies or individual members to participate in such program.

Adjourned at 12:00 M. to meet again at 2:00 P. M.

#### Afternoon Session

**January 17, 1924.**—The Annual Meeting of the City Planning Division was reconvened at 2:00 P. M.; Chairman Nelson P. Lewis presiding; C. B. Ball, Secretary; and present, also, about 60 members and guests.

Following the report of Chairman George H. Norton of the Nominating Committee, the following were elected as the Executive Committee for 1924: Messrs. Nelson P. Lewis, E. A. Fisher, Harland Bartholomew, Charles B. Ball, and Morris Knowles.

Chairman Lewis introduced Mr. Arthur S. Tuttle who presented a paper entitled "Increasing the Capacity of Existing Streets", illustrating his remarks with lantern slides.

Mr. Tuttle was followed by Harvey W. Corbett, Esq., who enlarged on the topic presented by Mr. Tuttle, also illustrating his address by lantern slides.

A paper entitled "Two-Level Streets in Chicago, Illinois", by Messrs. C. D. Hill and Jacob L. Crane, was presented by Mr. Crane, who used lantern slides to illustrate the paper.

(Mr. Morris Knowles took the chair.)

The subject presented in the papers was discussed by Messrs. E. P. Goodrich, William F. Fox, Harland Bartholomew, T. Kennard Thomson, W. W. Crosby, George S. Davison, George T. Seabury, and the authors.

Adjourned.

#### INFORMAL CONFERENCE OF LOCAL SECTION REPRESENTATIVES

(Abstract)

##### Morning Session

**January 17, 1924.**—An Informal Conference of Local Section Representatives was called to order at 10:40 A. M., at the Engineering Societies Building, New York, N. Y.; Mr. Richard L. Humphrey in the chair; and present, also, about 50 representatives and guests.

After introductory remarks relative to the objects and program of the conferences, Chairman Humphrey announced the death, on December 23, 1923, of George Gray Anderson, M. Am. Soc. C. E., a member of the Board of Direction and of the Standing Committee on Local Sections. On motion, carried unanimously, Chairman Humphrey appointed Messrs. John F. Coleman, Baxter L. Brown, and Allen Hazen, as a Committee to prepare suitable resolutions on the death of Mr. Anderson for action by the Conference.

A method of reporting changes in addresses to the Local Sections concerned, was discussed by Messrs. John H. Feigel and C. D. Avery.

The Chairman presented an abstract of the replies to the Questionnaire sent to the Local Sections relative to the holding of Conferences of Representa-

tives of the Sections. After discussion by Messrs. Earl Stimson, Allen Hazen, John C. Hoyt, John F. Coleman, A. C. Everham, J. C. Carpenter, and Louis Mitchell, a motion that a meeting of the representatives of the Local Sections shall be held at each of the four meetings of the Society, and that the Annual Meeting shall be coincident with the Annual Meeting of the Society, was adopted.

A resolution that the expenses of the delegates of the Local Sections attending these meetings be assumed by the delegates themselves, after discussion by Messrs. Brown, Coleman, Avery, Mitchell, and Stimson, was amended to concur with the action of the Board of Direction of the Society in not allowing mileage to representatives of Local Sections and to leave the question of such payment to the Section, which amendment was adopted.

The question of organization and the election of a Chairman of the Conferences of Local Section Representatives was discussed by Messrs. Allen Hazen, J. C. Hoyt, F. H. McDonald, and J. H. Edwards, and, on motion, Mr. Richard L. Humphrey who had been nominated previously, was elected Chairman of the 1924 Annual Conference.

The question of the aims, scope, and power of the Conference was discussed by Messrs. Edwards, J. C. Hoyt, G. L. Bean, and Mitchell, and a motion was made that a Committee of three be appointed to report at a later session on the plan and scope of these Conferences. After discussion by Messrs. Carpenter, W. H. Hoyt, Mitchell, Stimson, George G. Earl, J. C. Hoyt, G. H. Fenkell, McDonald, and F. O. Dufour, this motion was adopted, and Chairman Humphrey appointed Messrs. Mitchell, Stimson, and Coleman as such Committee.

The meeting was addressed by John L. Harrington, M. Am. Soc. C. E., Past-President of the American Society of Mechanical Engineers, on the conduct and work of the Conferences of the Local Sections of that Society. Mr. Harrington's address was followed by discussion of the subject by Messrs. T. L. Condron, J. C. Ralston, Fenkell, J. C. Hoyt, and Mitchell, after which a rising vote of thanks was extended to Mr. Harrington.

Adjourned at 12:00 M. to meet again at 2:30 P. M.

#### Afternoon Session

**January 17, 1924.**—The Informal Conference of Local Section Representatives was reconvened at 2:30 P. M., at the Engineering Societies Building, New York, N. Y.; Chairman Richard L. Humphrey presiding; and present, also, about 50 members and guests.

The following resolution on the death of George Gray Anderson, M. Am. Soc. C. E., was adopted by a rising vote as a tribute to Mr. Anderson:

*"Whereas, by the death of George Gray Anderson, the Local Sections of the American Society of Civil Engineers have lost a prominent advocate; and*

*"Whereas, Mr. Anderson has been an untiring and zealous worker in the interests of the Local Sections; be it*

*"Resolved, that this conference of representatives of the Local Sections of the American Society of Civil Engineers acknowledges its indebtedness to this wise counsellor who has given so ungrudgingly and unselfishly of his valuable time to our objects and purposes; and be it further*

*"Resolved,* that this Conference desires to record its sense of profound sorrow in the great loss not only to itself, but to the Engineering Profession; and be it further

*"Resolved,* that a copy of these resolutions be forwarded to the family of Mr. Anderson".

After a brief outline by Chairman Humphrey of the By-Laws of some of the Founder Societies, which provide for the Annual Conferences of their Local Sections, and of the programs carried out at such Conferences, the report of the Committee on Plan and Scope was presented by Mr. Stimson as follows:

#### "RULES OF ORDER

"The name of this Conference shall be the Local Sections Conference.

"The object of this Conference is:

"1.—To establish a point of contact between the Local Sections, and between the Local Sections as a whole and the Board of Direction of the Society.

"2.—To furnish a medium for exchange of views outlining uniformity of procedure and for co-ordinating the activities of the various Local Sections with those of the Society.

"3.—The action of the Conference shall be of a recommendatory character and not binding on the individual Local Sections.

"4.—Membership.—The membership of this Conference shall be the authorized representatives of Local Sections.

"5.—Meetings.—The Conference shall hold four meetings each year concurrent with the Quarterly Meetings of the Society. The Annual Meeting shall be at the time of the Annual Meeting of the Society.

"6.—Representation.—Each Local Section shall be represented at the meetings of the Conference by its President or a delegate chosen to act in his stead.

"7.—Balloting:

"a.—Each Section shall be entitled to one vote.

"b.—The majority vote of those present shall govern, but a record of the 'aye' and 'nay' vote shall be entered upon the minutes.

"c.—Those present at any meeting shall constitute a quorum.

"7.—Officers:

"a.—The officers of the Conference shall be a Chairman, a Vice-Chairman, and a Secretary.

"b.—The Chairman shall direct the affairs of the Conference and shall preside at its meetings.

"c.—The Vice-Chairman shall act in the absence of the Chairman.

"d.—The Secretary shall perform the customary secretarial duties.

"8.—Election of Officers:

"a.—The Chairman and Vice-Chairman shall be elected at the Annual Meeting.

"b.—The Secretary shall be a permanent appointee of the Board of Direction.

"9.—Parliamentary Authority.—The deliberations of the Conference shall be governed by Robert's Rules of Order."

The proposed Rules of Order were discussed by Messrs. Ralston, Condron, McDonald, Coleman, and Dorrance, and, on motion, were adopted by the meeting, after which, on motion, duly seconded and carried, Messrs. Humphrey

and Coleman were elected Permanent Chairman and Vice-Chairman, respectively.

On motion, the Rules of Order were ordered to be submitted to the Board of Direction for approval, with the request that the Board assign one of its staff to serve as Permanent Secretary.

The question of recommending to the Board of Direction for consideration the participation on the part of the Society and the Local Sections in Government activities—National, State, and municipal—along technical lines, was discussed by Messrs. McDonald, Watson, Coleman, Ralston, and J. C. Hoyt.

Relative to the question of programs for future Conferences, Chairman Humphrey presented an abstract of the suggestions thereon received through the Questionnaire. These suggestions were discussed by Messrs. Carpenter, W. H. Hoyt, Herbert, and Fenkell, and, on motion, the Chairman was appointed to formulate programs for the three meetings to be held in 1924 in connection with the Quarterly Meetings of the Society.

Secretary John H. Dunlap of the Society addressed the Conference relative to his recent visits to the various Local Sections. He was followed by Mr. Harrington who discussed briefly the questions that have proved of greatest interest at Conferences of the Local Sections of the American Society of Mechanical Engineers.

The matter of licensing or registration of engineers was discussed by Messrs. Mitchell, Coleman, Ralston, Avery, Marston, Saville, McDonald, Howe, Shank, Bean, Condron, Harrington, Whitman, Feigel, Carpenter, Chester, Edwards, Dorrance, Stimson, Moore, and Chairman Humphrey, and, on motion, it was decided that the Tentative Report and the proposed Bill for the Licensing of Engineers presented by the Committee on Registration of Engineers to the Board of Direction should be published and made available to the various Local Sections.

The personnel of the new Standing Committee of the Board of Direction, consisting of Messrs. George H. Fenkell, Chairman, Arthur O. Ridgway, and J. M. Howe, was announced.

Adjourned.

## EXCURSIONS AND ENTERTAINMENTS

### AT THE SEVENTY-FIRST ANNUAL MEETING

**Wednesday, January 16, 1924.**—A Reception and Dinner Dance in honor of the President and the newly elected Honorary Members of the Society was held at the Hotel Pennsylvania, at which about 380 members and guests were present. Following the Reception, dinner was served about 8:30 p. m., at the conclusion of which a concert by the Singers Club of New York, was enjoyed. Dancing was continued until 2:00 a. m.



**Thursday, January 17, 1924.**—A Dinner Conference on Engineering Education was held at the Hotel Pennsylvania at 6:00 P. M. Following the dinner, the subject of the proposed investigation of Engineering Education was discussed in detail. About 115 members and guests were in attendance.

At 8:00 P. M., Professor Charles P. Berkey, of Columbia University, addressed about 580 members and guests on the subject of "Explorations in the Desert Regions of Central Asia", illustrating his talk by interesting slides. Following this address, an Informal Smoker and Social was held on the Fifth Floor of the Engineering Societies Building.

**Friday, January 18, 1924.**—An excursion about New York Harbor was enjoyed by about 375 members and guests, thanks to the courtesy of the Hon. Grover A. Whalen, Commissioner of Plants and Structures of the City of New York, who furnished a municipal ferry-boat and the Municipal Band. Opportunity was given to inspect the Supply Depot of the United States Department of Lighthouses at Tompkinsville and also one of the caissons of the new Narrows Tunnel now being constructed.

After a sail up the East River to view the municipal bridges, luncheon was served on the boat and a landing was made at South Ferry about 1:00 P. M. In the afternoon, the trip up the Hudson River enabled the visitors to view the water-front, returning to Canal Street, where the boat was docked in time to commence inspection of the New York-New Jersey Vehicular Tunnel, through the courtesy of C. M. Holland, M. Am. Soc. C. E., Chief Engineer for the Commission, and of Booth and Flinn, Contractors. Fortunately, the compressed air ordinarily used in this work had been temporarily discontinued, and the party was able to traverse the Manhattan Headings as far as the shield, about under the pier-head lines.

During the same day about 25 members enjoyed several trips arranged by the Sanitary Engineering Division. In the morning, the Woodside Tunnel Sewer in the Borough of Queens was visited, and, in the afternoon, a new incinerator at 56th Street and 12th Avenue, New York City, was inspected. Following this, the party went to Scarsdale, N. Y., where a modern garbage disposal plant was visited.

## **Annual Reports**

### **ANNUAL REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31, 1923.**

In compliance with the Constitution, the Board of Direction presents its Report for the year ending December 31, 1923.

#### **THE SEVENTY-FIRST YEAR**

Several of the outstanding events of the seventy-first year of the Society will first be briefly described after which the detailed accounts of major activities will follow.

#### **World-Wide Co-operation of Engineers**

During the past year there have been several most gratifying indications of the essential solidarity of the engineering profession throughout the world. For example, the Society has been represented upon the American Committee, organized on invitation of the British Committee to participate in a World Power Conference to be held in London, June 30 to July 12, 1924, at the time of the British Empire Exposition. In addition to Great Britain and the United States, the following countries are participating in the Conference: Australia, Austria, Belgium, Canada, Czecho Slovakia, Denmark, France, Greece, Holland, India, Italy, Norway, Roumania, and Sweden. It is expected that reviews will be presented of the power resources and of the related economic and legal problems of the various countries. This will be the first time that the power problem of the world will have been comprehensively surveyed.

Another project of even broader scope is the World Congress of Engineers which is now being planned for Philadelphia in October, 1926. The Society is represented on the Board of Management and Herbert Hoover, M. Am. Soc. C. E., Secretary of Commerce, has been elected Honorary President. The Society's Annual Convention in 1926 will occur in Philadelphia in conjunction with the sessions of the Congress and the meetings of the other national societies to be held at the same time.

In recognition of the world-wide membership of the Society, a questionnaire has been sent out under the auspices of the Committee on Registration of Engineers, to the principal engineering societies of the world and also to the members of the Society in other countries. In addition to inquiring about the legal status of engineers in these countries, the question was asked: "What is the professional status of the engineering profession in your country as compared with that of the other learned professions, particularly with reference to public recognition and community standing?" Many very interesting replies have been received both from individuals and societies, a digest of which will be made. It is believed that the replies will present much information hitherto unavailable.

#### **The Joint Conference Committee**

On April 16, 1923, the Board of Direction authorized a Committee of five members, with the President as Chairman, to confer with the officials of the

other national engineering societies with a view to formulating some permanent workable method of joint co-operation on public matters and to report its recommendation to the Board. The other three Founder Societies promptly accepted the invitation to appoint similar committees, which in each case included the President of the Society. As a result of the deliberations of this joint committee, it was decided to recommend to the Boards of Direction of the four Societies the appointment of a Joint Conference Committee, consisting of the four Presidents and the four Secretaries. The first chairman of the Committee for a term of one year is to be the President of the American Society of Civil Engineers and thereafter the President of each of the four Founder Societies in order of seniority. The Secretary of the Committee is to be the Secretary of the Society whose President is Chairman of the Committee. The four Boards have approved the plan and the first formal meeting of the Joint Conference Committee is to be held January 21, 1924. An informal meeting was held on December 10, 1923, in advance of the approval by all four Boards, in order to discuss some of the more pressing common problems of the Founder Societies.

The British Engineering Joint Council, composed of representatives of the Institution of Civil Engineers, the Institution of Mechanical Engineers, the Institution of Naval Architects and the Institution of Electrical Engineers, has already shown its interest in this new undertaking as is indicated by the following quotation from a letter of December 12, 1923, from Dr. H. H. Jeffcott, Secretary of the Joint Council:

"Our Engineering Joint Council were much interested to learn of the action recently taken in connection with co-operation between engineers in America. The problems to be faced there are similar in many respects to those which have to be dealt with in this country and I am desired to say that the Engineering Joint Council will always be glad to be kept *au courant* with developments in America, and to keep your Committee in touch with what is being done over here.

"May I ask you to convey to the American Joint Committee the best wishes of the members of the Engineering Joint Council for the success of this new body, whose future development the Engineering Joint Council will watch with much interest."

This indicates that the Joint Conference Committee has before it, not only the duty of fostering the admirable spirit of co-operation now characterizing the relations of the four Founder Societies, but also the great opportunity of assisting in cementing still more firmly the close ties of friendship already existing between engineers in England and America.

#### Public Relations

In addition to the activities of the Standing Committee of the Board of Direction on Public Relations, the Board of Direction has appointed two important committees to deal with specific matters of unusual public concern. Following the resignation of Past-President Arthur P. Davis as Director of the Reclamation Service, prompt action was taken in appointing a Committee to investigate the causes which led to the resignation, and to make recommendations to the Board. Based on this Committee's findings, the Board of Direction with the unanimous endorsement of the Society at the Fall Meeting in

Richmond, Virginia, October 17, 1923, addressed a letter to the Secretary of the Interior, protesting his action in removing Mr. Davis, and declaring engineering ability and experience to be essential to the direction and management, no less than to the building of reclamation projects.

The second committee on an important public issue was authorized by the Board of Direction on April 16, 1923, to consist of five members, the President of the Society to be the Chairman, to present resolutions favoring federal re-organization to the President of the United States, to appropriate officials of the Congress and of the Executive Departments and to take such other action as seemed best. On October 30, 1923, President Coolidge granted the Committee an audience in the Executive Offices at Washington. President Loweth assured the President that the members of the Society were interested as citizens in the general problem of re-organization of Government departments, and pointed out that as engineers they felt especially qualified to advise intelligently in regard to assembling and co-ordinating the non-military engineering activities of the Government. The President expressed his appreciation of the offer by the Committee of any assistance that the Society may be able to render either to him or to his assistants in the development of a plan of re-organization.

In addition to the conference with the President, the Committee has devoted considerable time to other conferences in Washington, including participation in the Public Works Conference on January 9, 1924. At the proper moment it is intended to utilize the Local Sections in approaching the members of Congress with carefully prepared arguments in favor of the plan finally approved.

#### **Increased Scope of Local Section Activities**

On April 16, 1923, the Board of Direction authorized the appointment by each of the Local Sections of Sub-committees on Membership to assist the Board of Direction by making recommendations concerning the qualifications of applicants for membership and transfer. In the territory outside the jurisdiction of Local Sections additional Sub-committees will be appointed under the direction of the Director of the District. It is hoped that through the work of these Sub-committees the high standards of membership which have prevailed in the past may be maintained and if possible elevated still higher.

This policy of encouraging participation by the Local Sections in the affairs of the Society was carried one step further on October 15, 1923, when the Board of Direction authorized sub-committees in the Local Sections to co-operate with the following Standing Committees of the Board: the Standing Committee on Technical Activities and Publications, the Standing Committee on Public Relations, the Standing Committee on Research and the Standing Committee on Local Sections. It is now possible for such Local Sections as accept the invitation to appoint these sub-committees to assist greatly in the work of the Society.

#### **Re-Arrangement of the Fifteenth Floor**

During the past year the partitions on the 15th floor have been altered so that three additional offices have been created in part of the space formerly



occupied by the Reading Room. This change has brought the Editorial Department and the Assistant Secretary's office from the 16th floor to the 15th floor, where they are conveniently located with reference to closely related activities. The Reading Room has been refurnished attractively, and though smaller than before, it is believed to be adequate for its purpose. The entrance hall has been artistically finished in marble. New portieres in the Board Room make it possible to divide the room into two committee rooms, which are frequently needed. The relighting of the Board Room has been worked out with a result more satisfactory than was first thought feasible. A new door has been added connecting the Secretary's office with the Board Room, which gives much needed additional reception facilities.

### MEMBERSHIP

Passing now from brief mention of outstanding events to the detailed accounts of major activities, the statistics of change of membership are first presented.

	JAN. 1, 1923.			JAN. 1, 1924.			LOSSES.				ADDITIONS.		TOTALS.		
	Resident.	Non-Resident.	Total.	Resident.	Non-Resident.	Total.	Transfer.	Resignation.	Dropped.	Death.	Transfer.	Election.	Loss.	Gain.	Increase.
Honorary Members.....	2	9	11	2	11	13	0	0	0	0	*2	0	0	2	2
Members.....	846	835	4 681	868	3 954	4 822	2	22	43	72	†131	‡150	139	281	141
Associate Members.....	799	4 441	5 240	843	4 454	5 297	131	81	130	13	‡53	‡55	355	412	57
Juniors.....	93	386	479	141	466	607	52	11	23	2	.....	215	88	215	128
Affiliates.....	59	109	168	59	101	160	1	.....	9	7	.....	9	17	9	18
Fellows.....	4	5	9	4	5	9	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals.....	1 803	8 785	10 588	1 917	8 991	10 908	186	114	205	94	186	733	599	919	320

\* 2 Members.

† 131 Associate Members.

‡ 52 Juniors, 1 Affiliate.

§ 7 Reinstatements.

|| 4 Reinstatements.

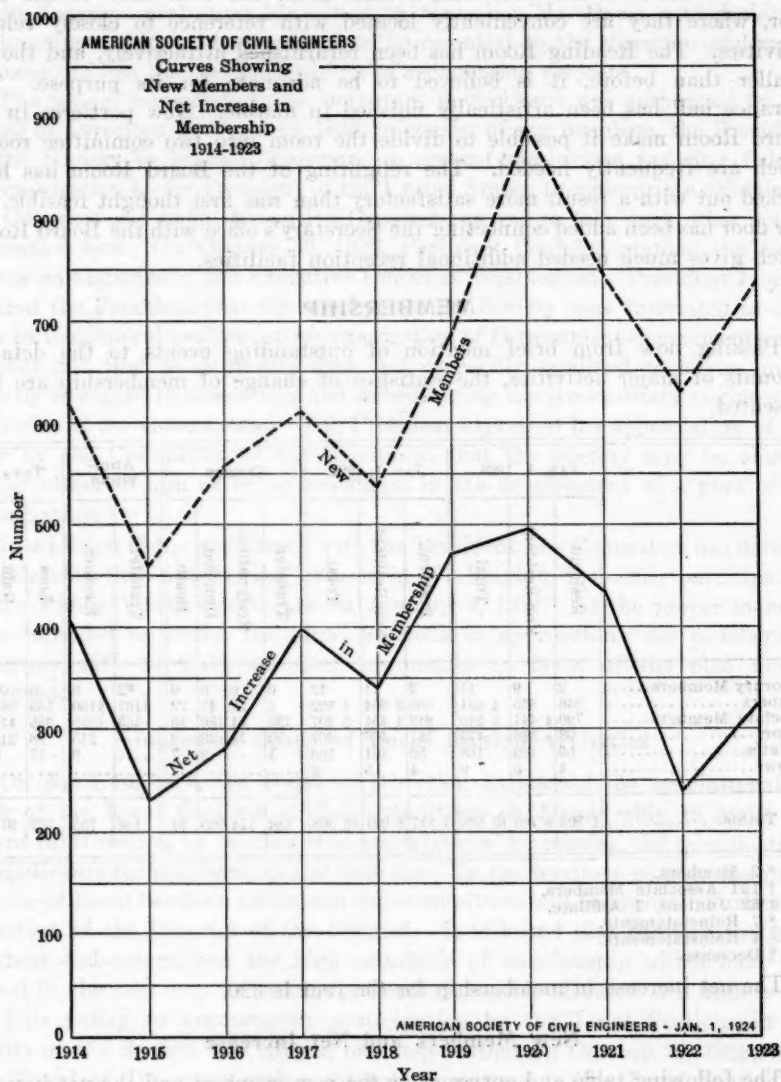
¶ Decrease.

The net increase in membership for the year is 320.

### New Members and Net Increase

The following table and curves show the new members and the net increase in membership during the past ten years. It is interesting to note that both curves began in 1923 to incline upward again after the decline in 1921 and 1922. This is principally due to the increase of 128 in Juniors as compared with 21 for 1922, a reflection of the interest in the Society aroused through the activities of the Student Chapters, the first of which was organized in 1920.

	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
New Members .....	613	461	552	608	537	687	887	743	636	733
Net increase in Membership .....	406	231	283	398	343	475	499	435	246	320



CURVES SHOWING NEW MEMBERS AND NET INCREASE IN MEMBERSHIP, 1914-1923.

### International Aspects of Membership

Scarcely a day passes during which the Society does not have contact with several foreign countries, either by correspondence or by calls at the Secretary's office. The following table summarizes the membership outside Continental United States and Canada:

Mexico .....	46
Central America .....	33
South America .....	104
West India Islands .....	104
Europe .....	135
Africa .....	15
Asia .....	172
Australasia .....	43
<b>Total .....</b>	<b>652</b>

### APPLICATIONS FOR MEMBERSHIP

The total number of applications received has been 1 113: 896 for admission, and 217 for transfer.

### DEATHS

The losses by death during the year number 94, and are as follows:

Members (72): George Gray Anderson, William Coulson Armstrong, August Ellsworth Bachert, George Whitney Bates, Thomas Pettus Branch, Le Grand Brown, Thomas Ellis Brown, William Dexter Bullock, Milo Darwin Burke, Adam Leonard Bush, Shirley Carter, David Dexter Clarke, Henry Edward Coane, William George Comber, Thomas White Cothran, Benjamin Franklin Cresson, Jr., Leroy Webster Cummings, James Henry Cunningham, B. J. Dalton, Thomas Remington Holden Daniels, Justus Vinton Dart, Edward Thomas Flaherty, Charles Frommer, William Barnard Fuller, Frederick Giddings, Henry Stevens Haines, Frank Henry Hamilton, James Smith Haring, Edmund Hayes, Charles Frank Healey, Rudolph Hering, Frank Wellington Hodgdon, William Augustus Howell, Robert Woolston Hunt, Walter Gladden Hunter, Gustave Kaufman, Louis Henry Knapp, Charles William Knight, Charles Newton Little, John Alexander Macnicol, William McNab, Sampson Douglas Mason, William Andrew May, Edward Thomas Every Miller, Frank Miller, Hiram Allen Miller, Charles Neilson, Adelbert Franklin Parker, William Baird Patton, Julius Pitzman, Archibald Olin Powell, Franklin Cogswell Prindle, Arthur Breese Proal, Jr., Frank Arthur Rapp, David Reeves, Victor Herman Reineking, Samuel Rockwell, Alpheus Timothy Sabin, Edward Emmet Sands, James Robinson Scott, Jr., Theodor Semenovitch Shmeleff, Julio Federico Sorzano, Frederick Putnam Spalding, Rex Cameron Starr, Clarence Everett Tait, William Stuart Tait, Benjamin Franklin Thomas, Henry Hayes Wadsworth, Charles Sumner Williamson, Isaac Winston, Henry Amerman Young, George Brown Zahniser.

Associate Members (13): Kingsley Parkhurst Arnoll, Charles Felix Bartholomees, Eduardo Beaven, William James Chouinard, Alvin Bartholdi Fox, Jay Clark Holland, Clarence Cecil Jacob, Harry Willey Kenney, George Whitney Kinne, Edgar Day Knap, Milan Nikolitch, Ralph Alexander Rollo, Hilmar Frederick Smith.

Affiliates (7): John Alexander Britton, Edward James Farrell, William John Charles Kenyon, Willard Adelbert Smith, Merrill Watson, George Adam Weber, Parker Richards Whitney.

Juniors (2): John Jacob Hopper, Leslie Edward Pierce.

### LIBRARY

The Engineering Societies Library received during 1923 a total of 3 503 volumes (2 082 by gift, 558 by purchase, 863 by binding); 66 pamphlets (57 by gift, 9 by purchase); and 130 maps and drawings, making a total of 158 710 now in the permanent collection.

Expenditures for books, periodicals, supplies and salaries were approximately \$32 000. 24 084 persons visited the Library during the year.

During the year 14 456 volumes passed through the hands of the catalogers. 47 815 cards were prepared and 16 392 subjects were added to the catalog.

The Service Bureau made 256 searches and 141 translations, totaling 324 435 words. It prepared 24 092 photoprints for 2 570 persons. The receipts for this work were about \$15 000.

### New Lending Service

During the past year, the Library has established a lending department. This department has a good collection of modern up-to-date American books on engineering which will be loaned, at a small rental, by mail or express, to members of the Founder Societies and of other societies that contribute regularly to the support of the Library. This service will make immediately available to the non-resident membership a part of the great resources of the Library.

### READING ROOM

The attendance at the Reading Room during the past year was 3 864. This is a decrease of 1 030, probably due to the extensive alterations to that room during the summer, and the resulting confusion.

On account of lack of space, the number of periodicals received has been considerably curtailed, but the magazines eliminated were not of particular interest to civil engineers.

The monthly list of recent engineering articles prepared by the assistants in the Reading Room contained 1 925 classified references to 50 periodicals and covered 73 pages. They included French and German titles.

### EMPLOYMENT SERVICE

A new plan of operating the Employment Service maintained by the four Founder Societies became effective September 1, 1923. Under this plan the Founder Societies will appropriate next year about one-half the amount of last year for its support. A charge will be made to members who obtain positions through the Employment Service; and registration with the Service will



be restricted to members of the four Founder Societies. Any surplus at the end of the first year from the income from fees and the amount appropriated by the Founder Societies will be used for extending the Service to the principal engineering centers of the country, this arrangement to be continued from year to year. It is hoped that by this plan the Service will eventually be National in scope, yet so flexible that it will accommodate itself to local needs.

The number of men registered and placed in the year 1923 is indicated below:

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Number of men registered .....	102	76	120	99	114	124	90	88	108	154	74	130	1 279
Number of men placed .....	220	177	267	286	184	204	127	122	55	68	79	74	1 863

### COMMITTEES

At the meeting of the Board in July amendments to the By-Laws were adopted which abolished the Standing Committee on Special Committees and provided for a Standing Committee on Research, which had been organized January 16, 1922, as a Special Committee. The duties of that Committee are to organize, stimulate and supervise the research work of the Society as conducted by its committees or through co-operation with societies and individuals, in accordance with the directions and regulations of the Board. The Executive Committee is charged with the approval of expenditures of all Special Committees and with the supervision of all Special Committees other than those placed by the Board within the jurisdiction of the Committee on Research.

There are now fifteen Special Committees authorized to report on engineering subjects as follows:

To Codify Present Practice on the Bearing Value of Soils for Foundations (Authorized December 3, 1912).

Stresses in Railroad Track (Authorized November 12, 1913).

Highway Engineering (Authorized October 14, 1919).

To Consider and Recommend for Adoption a Specification for Bridge Design and Construction (Authorized August 9, 1920).

Standard Construction Contracts (Authorized June 6, 1921).

Electrification of Steam Railways (Authorized January 16, 1922).

Fire Prevention of Docks, Piers and Wharves (Authorized January 16, 1922).

Impact in Highway Bridges (Authorized April 4, 1922).

Stresses in Structural Steel (Authorized April 4, 1922).

Flood Protection Data (Authorized April 4, 1922).

Irrigation Hydraulics (Authorized April 4, 1922).

Hydraulics Phenomena (Authorized April 4, 1922).

Concrete and Reinforced Concrete Arches (Authorized January 16, 1923).

Steel Column Research (Authorized January 16, 1923).

Effects of Earthquakes on Engineering Structures with Special Reference to the Japanese Earthquake of September 1, 1923 (Authorized October 16, 1923).

The Board has placed all of the above committees under the supervision of the Committee on Research except the Committees on Highway Engineering, Bridge Design and Construction, Standard Construction Contracts, and Electrification of Steam Railways, Fire Prevention of Docks, Piers and Wharves, and Effects of Earthquakes on Engineering Structures.

Mention should also be made of the Alfred Noble Memorial Committee (authorized June 2, 1914). During the past year the Committee has made two appeals for funds with the result that approximately \$13 000 has been received toward the \$100 000 needed.

#### Additional Committees

In addition to the Committees of the Society, the Board of Direction has nine Standing Committees and whenever need arises appoints special committees. Furthermore, the Society is represented jointly with other National Societies on 50 boards and committees,

#### Gifts for Committee Work

Gifts have been received for the work of the Committee on Stresses in Railroad Track: From the Illinois Steel Company, \$2 500, and from the Bethlehem Steel Company, \$3 000. Engineering Foundation has contributed \$1 000 to the work of the Committee on Concrete and Reinforced Concrete Arches, and \$1 000 to the Committee on Steel Column Research. The Board desires to express its appreciation of the generosity which prompted these gifts. They not only encourage committee members who give much time and thought to the work, but are a recognition by outside organizations of the sterling results already achieved.

#### PUBLICATIONS

Ten numbers of *Proceedings*, a Year Book, one volume of *Transactions* and a new edition of the pamphlet entitled "Aims and Activities" have been published in the year 1923.

The stock of the various publications of the Society kept on hand for the convenience of members and others now amounts to 79 578 copies, the cost of which to the Society, for paper and press work only, has been \$20 177.51.

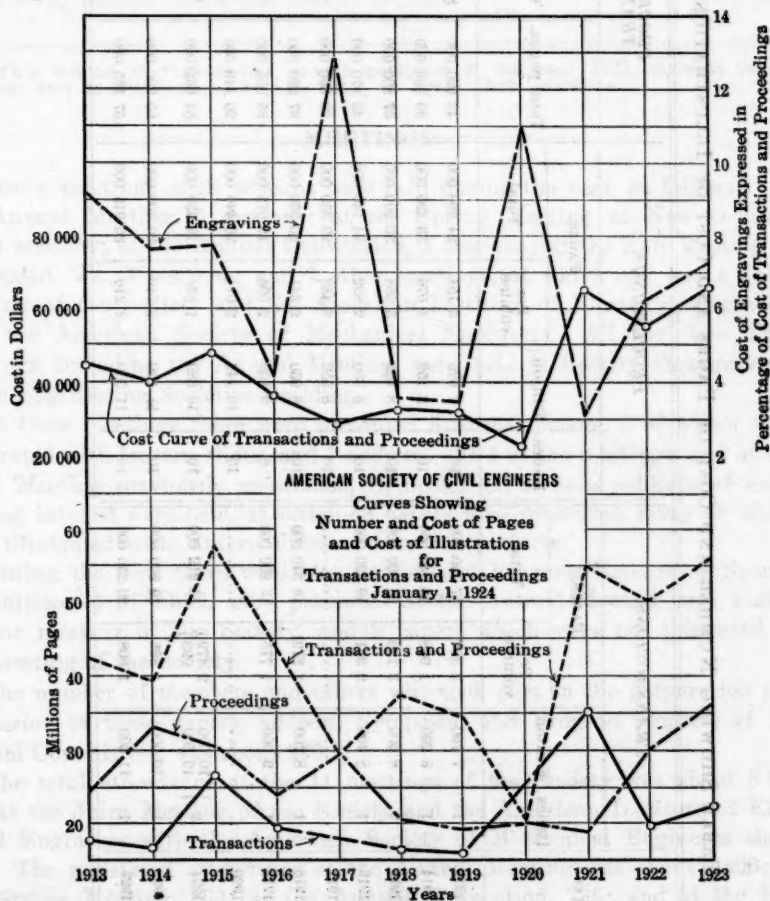
The diagram and table (see pages 12 and 13) show the cost per page for text and illustrations in *Proceedings* and *Transactions* for the past eleven years.

#### Summary of Publications for 1923

	Issues	Average Edition	Total Pages	Plates	Cuts
<i>Proceedings</i> (monthly numbers).....	10	11 500	3 210	9	527
<i>Transactions</i> , Vol. LXXXVI.....	1	11 200	1 808	14	347
Year Book .....	1	11 500	395	1	..
"Aims and Activities" .....	1	16 000	34	1	3
Total .....	13	.....	5 447	25	877

The cost of publications, as determined by the bills actually paid during the year, has been:

For Paper, Printing, etc., <i>Proceedings</i> .....	\$32 401.78
For Paper, Printing, etc., of 14 175 Extra Copies of Papers, Discussions, Memoirs .....	887.05
For Paper, Printing, etc., <i>Transactions</i> Vol. LXXXVI.....	13 807.38
For 7 450 Extra Copies of Separate Papers for <i>Transactions</i> Vol. LXXXVI .....	1 201.27
For Binding, Envelopes, etc., <i>Proceedings</i> .....	6 404.14
For Binding,* Boxes, etc., <i>Transactions</i> Vol. LXXXVI.....	3 092.22
For Plates and Outs.....	4 906.33
For Year Book .....	4 826.43
For "Aims and Activities".....	1 284.39
For Copyright and Sundry Expenses.....	97.43
<b>Total .....</b>	<b>\$68 908.42</b>
Deduct amount received from sale of publications.....	5 092.04
<b>Net expenditures for publications for 1923.....</b>	<b>\$63 816.38</b>



CURVES SHOWING NUMBER AND COSTS OF PAGES AND ILLUSTRATIONS FOR *Transactions* AND *Proceedings*, 1913-1924.

\* Paper binding only.

TABLE SHOWING NUMBER AND COST OF PAGES AND COST OF ILLUSTRATIONS FOR Transactions and Proceedings.

Year.	TRANSACTIONS.				PROCEEDINGS.				PROCEEDINGS and TRANSACTIONS.			ILLUSTRATIONS.		
	Issues.	Edition.	PAGES.		Issues.	Edition.	PAGES.		Total pages.	Total cost.	Cost per page.	Cost.	Percentage of total cost.	Cost per page.
			Per volume.	Total.			Per volume.	Total.						
1913	1	7 700	2 302	17 740 000	10	7 625	3 184	24 280 000	42 020 000	\$43 329.77	\$0.00103	\$3 964.16	9.1	\$0.000094
1914	1	8 200	1 968	16 140 000	10	8 150	4 076	33 220 000	39 860 000	89 089.89	0.00099	2 968.32	7.6	0.000075
1915	2	8 600	3 130	26 900 000	10	8 425	3 668	30 900 000	57 800 000	47 934.16	0.00083	3 684.68	7.7	0.000064
1916	1	8 400	2 301	19 330 000	10	8 350	2 892	24 140 000	43 470 000	85 645.65	0.00082	1 403.12	8.9	0.000082
1917	..	.....	.....	.....	10	8 550	3 482	29 350 000	29 850 000	28 608.18	0.00097	3 768.97	12.9	0.000126
1918	1	8 700	1 879	16 340 000	10	8 950	2 341	20 950 000	37 290 000	83 785.64	0.00091	1 192.20	3.5	0.000032
1919	1	9 000	1 775	15 980 000	8	9 100	2 096	19 075 000	35 055 000	82 082.69	0.00091	1 128.53	3.5	0.000032
1920	..	.....	.....	.....	10	10 142	2 014	20 440 000	20 440 000	23 446.34	0.00115	2 552.27	10.9	0.000125
1921	2	10 000 10 500	2 473 983	35 212 000	10	10 680	1 894	19 450 000	54 662 000	66 298.89	0.00121	2 084.72	3.1	0.000037
1922	1	10 900	1 836	19 900 000	10	11 100	2 740	30 400 000	50 800 000	56 200.00	0.00112	3 700.00	6.6	0.000079
1923	1	11 200	1 808	20 250 000	10	11 500	3 210	36 915 000	57 165 000	67 016.97	0.00117	4 809.88	7.2	0.000084

\* Paper binding only.



It is thought that the membership will be interested in the subjects of the papers and discussion printed in *Proceedings* and *Transactions* during the past year, and the number of pages devoted to each follows:

	<i>Transactions*</i>	<i>Proceedings</i>
Hydrology. Hydraulics.....	58	58
Engineering Education.....	42	42
Engineering Research.....	46	50
Highway Engineering.....	4	.....
Dams.....	196	335
Engineering Societies.....	13	13
Structural Engineering.....	441	327
Materials of Engineering.....	204	149
Railways.....	233	460
Waterways.....	46	202
Steam Engineering.....	31	31
Water Power.....	187	62
Sanitation.....	109	15
Mathematics.....	.....	63
City Planning.....	58	58
	1 610	1 925

\* This volume of *Transactions*, though published in the year 1923, includes papers published first in *Proceedings*, August, 1922, to April, 1923, inclusive.

### MEETINGS

Eleven meetings of 24 sessions were held during the year, as follows: At the Annual Meeting, 5 sessions; at the Spring Meeting at New Orleans, La., 4 sessions; at the Annual Convention, 4 sessions; at the Fall Meeting at Richmond, Va., 4 sessions; and 7 other meetings, of which one was a Joint Meeting of the Society and the American Institute of Electrical Engineers with the American Society of Mechanical Engineers. All the New York meetings, including the Annual Meeting, were held at Society Headquarters in the Engineering Societies Building.

At these meetings there were presented 5 formal papers, 3 of which were illustrated with lantern slides, and 1 address. At 4 of the meetings, and at the Joint Meeting previously mentioned, Symposia on various subjects of engineering interest were held, at which 48 papers were presented, many of which were illustrated with lantern slides and motion pictures.

During the year there were also published 6 Progress Reports of Special Committees, 5 of which were presented at the Annual Meeting and 1 at a regular meeting of the Society, and 9 papers which were not presented at any meeting of the Society.

The number of members and others who took part in the preparation and discussion of these papers, address, Symposia, and Progress Reports of the Special Committees, was about 260.

The total attendance at the 11 meetings of the Society was about 3 660 and at the Joint Meeting of the Society and the American Institute of Electrical Engineers with the American Society of Mechanical Engineers about 750. The registered attendance at the Annual Meeting was about 1 600; at the Spring Meeting, 360; at the Annual Convention, 735; and at the Fall Meeting, 500.

The meetings of the Society during the year, together with the papers, etc., presented thereat, were as follows:

January 17 and 19, 1923 (Three Sessions) Symposia on "Engineering Education", "Engineering Research", and "City Planning".

January 18, 1923, "Transportation Keyed to Production", by Julius Barnes, President of the Chamber of Commerce of the United States.

February 14, 1923, "Reinforced Concrete Columns", by John Tucker, Jr., Esq.

March 7, 1923, "Lateral Earth Pressure: The Accurate Experimental Determination of the Lateral Earth Pressure, Together with a Résumé of Previous Experiments," by Jacob Feld, Jun. Am. Soc. C. E.

April 18 and 19, 1923 (Three Sessions), Symposium on "The River and Harbor Problems of the Lower Mississippi".

May 2, 1923, "The Design of Earth Dams", by Joel D. Justin, M. Am. Soc. C. E.

June 13, 1923, "The Disintegration of Cement in Sea Water", by William G. Atwood and A. A. Johnson, Members, Am. Soc. C. E.

July 11 and 12, 1923 (Two Sessions), Symposium on "Railroad Transportation and Railroads Terminals".

September 5, 1923, "Proposed Loading for Highway Bridges", by Harold D. Hussey, Esq.

October 17 and 18, 1923 (Two Sessions), Symposium on "Transportation Problems".

November 7, 1923, "Tentative Specifications on Steel Highway Bridge Superstructure"; Submitted as a Progress Report of the Special Committee on Specifications for Bridge Design and Construction.

December 5, 1923, Joint Meeting of the Society and the American Institute of Electrical Engineers with the American Society of Mechanical Engineers to discuss "Hydro-Electric Problems".

The papers published in *Proceedings*, but not presented at any meeting of the Society were, as follows:

January, 1923, "Analysis of Cost of Freight Service, Grand Trunk Railway Company of Canada", by J. P. Newell, M. Am. Soc. C. E.

April, 1923, "Elastic Stresses in Rock Surrounding Tunnels", by Charles P. Dunn, Assoc. M. Am. Soc. C. E.; and "A River Diversion on the Delta of the Colorado in Relation to Imperial Valley, California", by S. L. Rothery, M. Am. Soc. C. E.

May, 1923, "Theoretical Frequency Curves and Their Application", by H. Alden Foster, Assoc. M. Am. Soc. C. E.

August, 1923, "Improved Type of Multiple-Arch Dams", by Fred A. Noetzli, Assoc. M. Am. Soc. C. E.; and "Stresses in Multiple-Arch Dams", by B. F. Jakobsen, M. Am. Soc. C. E.

October, 1923, "Reactions for a Particular Type of Unsymmetrical Arch", by Carl B. Andrews, Assoc. M. Am. Soc. C. E.; and "Periodic Fluctuations of Rainfall in Hawaii", by Joel B. Cox, Assoc. M. Am. Soc. C. E.

November, 1923, "Ocean Beach Esplanade, San Francisco, California", by M. M. O'Shaughnessy, M. Am. Soc. C. E.

### MEDALS AND PRIZES

For the year ending July, 1923, prizes were awarded as follows:

The Norman Medal to D. B. Steinman, M. Am. Soc. C. E., for his paper entitled "Locomotive Loadings for Railway Bridges".

The J. James R. Croes Medal to James F. Sanborn, M. Am. Soc. C. E., for the paper by Charles P. Berkey, Esq., and James F. Sanborn, M. Am. Soc. C. E., entitled "Engineering Geology of the Catskill Water Supply".

The Thomas Fitch Rowland Prize to F. W. Peek, Jr., for his paper entitled "High-Voltage Power Transmission".

The James Laurie Prize to R. W. Gausmann, M. Am. Soc. C. E., and C. M. Madden, Assoc. M. Am. Soc. C. E., for their paper entitled "Experiments with Models of the Gilboa Dam and Spillway".

The Arthur M. Wellington Prize to J. P. Newell, M. Am. Soc. C. E., for his paper entitled "Analysis of Cost of Freight Service, Grand Trunk Railway Company of Canada".

The Collingwood Prize for Juniors to Jacob Feld, Jun. Am. Soc. C. E., for his paper entitled "Lateral Earth Pressure: The Accurate Experimental Determination of the Lateral Earth Pressure, Together with a Résumé of Previous Experiments".

### LOCAL SECTIONS

During 1923 the Secretary has succeeded in visiting all 42 of the Local Sections, either by special trips, or in connection with the quarterly meetings of the Society. The President and some of the Directors have also visited many of the Sections. The interchange of ideas and information on such occasions is proving most helpful in view of the increasing participation of the Sections in the affairs of the Society.

Allotments to Local Sections, made for the first time last year, have been continued, and have been increased from one dollar to two dollars per member in good standing, who has paid Section dues of not less than one dollar per year. The total cost this year has been \$6 305. A few of the Local Sections have not requested this allotment.

Of the 42 Local Sections three were organized during the year as follows:

North Carolina Section  
Rochester Section  
Syracuse Section

### TECHNICAL DIVISIONS

The interest shown by the membership at large in the organization and operation of the Technical Divisions is most encouraging and emphasizes the growing importance of this phase of the Society's activities.

There are now five Technical Divisions with a total membership of 1 861 as follows:

City Planning Division.....	80
Highway Division .....	701
Irrigation Division .....	301
Power Division .....	253
Sanitary Engineering Division.....	526

### Meetings

Organization meetings of the Highway, Irrigation, and Power Divisions were held during the Annual Meeting in New York, and of the City Planning Division during the Annual Convention in Chicago.

Regular meetings of the Power and Sanitary Engineering Divisions were held at Chicago, Ill., July 11, and of the Highway and Power Divisions at Richmond, Va., October 17, 1923.

### Assistance in Programs

At the meeting of the Power Division held in Chicago, Ill., on July 11, 1923, two papers were presented for discussion, as follows, "Power Development in the Middle West", by W. L. Abbott, Chief Power Engineer of the Commonwealth Edison Company of Chicago, Ill., which was illustrated with lantern slides, and "Ice Problems of Hydro-Electric Plants", by William T. Walker, M. Am. Soc. C. E. At the meeting of this Division held in Richmond, Va., October 17, 1923, a paper was presented by W. S. Lee, M. Am. Soc. C. E., entitled "Interconnection of Southern Appalachian Power Systems", illustrated with lantern slides.

At the meeting of the Highway Engineering Division held on October 17, 1923, at Richmond, Va., during the Fall Meeting of the Society, a paper was presented by C. M. Upham, Assoc. M. Am. Soc. C. E., entitled "Development of the State Highway System". This paper was also illustrated with lantern slides.

### The Rudolph Hering Medal

The Sanitary Engineering Division has placed in the hands of the Treasurer of the Society the sum of \$1 127.72, which amount is to be used in establishing the Rudolph Hering Medal, which is to be awarded to the best contribution to the *Proceedings* of the Society upon the fundamentals of sanitary engineering.

The rules governing the award of this Medal have not yet been acted upon by the Sanitary Engineering Division, or by the Board of Direction.

### STUDENT CHAPTERS

An amendment to the By-Laws adopted by the Board in October will enable the member of any Student Chapter to continue affiliation with the Chapter until the first day of the second January following graduation. Graduates desiring this affiliation must be recommended by the heads of the Civil Engineering Departments of their respective Engineering Colleges and make payment of \$4.50 which will entitle them to receive the *Proceedings* and



to the privilege of membership in any Local Section in the territory in which they may reside.

#### **Prizes for Members of Student Chapters**

The Portland, Oregon, Section has instituted three prizes, a first of \$25, a second of \$15, and a third of \$10 to be competed for annually by the students of the Senior Class taking the course in Civil Engineering at the Oregon Agricultural College. The competition is open to all regularly matriculated students in good standing. These prizes will be awarded to the writers of the three best papers discussing some problem which has come under research or the personal observation of the competitors. The prizes will be invested in standard technical works of permanent character which may be desired by the recipients suitably inscribed by the President of the Section.

The award of prizes to members of near-by Student Chapters has also been adopted by some other Sections.

The Annual Reports from Student Chapters contain many matters of interest, 12 of which have been selected for special mention.

#### **Bucknell**

In addition to regular meetings the Chapter supports a program of motion pictures of a general educational character.

#### **Cincinnati (Braune Engineering Society)**

Two days each month are devoted to joint meetings of all Technical Clubs at which motion pictures of engineering interest are shown.

#### **College of the City of New York**

It has been decided that the meetings of the Chapter played such a large part in developing certain faculties of the students not reached by the curriculum courses, that it would be of definite value to set aside one hour of each week for a meeting at which all the engineering students are present. This meeting is obligatory, and it is expected that each student will take part by adding information to the principal speaker's talk, asking questions, etc.

#### **Cornell**

The Chapter invites the student chapters of other National Societies, Professors, Instructors, local engineers, and in some cases the public, to the meetings at which it has speakers of particular interest.

#### **George Washington**

Meetings are held regularly once a month, the attendance is good, and the talks interesting and instructive. The treasury always has enough money to furnish some refreshments and smokes. The Chapter co-operates with the General Engineering Society of the University, every member of the Chapter being a member of the Society as well. Through the efforts of the Secretary, continuous publicity is obtained in the weekly University publication.

**Massachusetts Institute of Technology**

The Chapter attended a meeting held under the auspices of the Boston Society of Civil Engineers on January 24, and also visited the Amoskeag Mills on February 16.

The combined professional societies opened the laboratories for the inspection of guests on the evening of May 8. Over 600 attended the affair and enjoyed the continuous technical motion pictures and test runs on the mechanical, hydraulic and mining equipment, the highway exhibit, and many other special features.

**Michigan**

Only students who have scholastic standing above the average are eligible for election.

The Chapter entertained the Detroit Section in May, and were entertained by the Section in October.

Of the 18 men graduated in June, 17 immediately applied for membership in the Society.

**Nevada**

About thirty students of the different engineering departments left Reno on March 28, and returned on April 2. They visited the Associated Oil Refinery at Avon, Calif., the Hawaiian Sugar Refinery at Crockett, Calif., the stadium at Berkeley, Calif., the Judson Iron Works, the Bethlehem Ship Yards, the Pelton Water Wheel Manufacturing Company, and the Pacific Gas and Electric Company of San Francisco, Calif.

**Oregon State**

A joint meeting of this Chapter and the Portland Section was held, at which three prize papers were read, and the awards made.

**Stanford**

This Chapter is raising a scholarship fund to be used toward the support of some engineering student.

It is the custom to send at least one delegate to the regular meetings of the San Francisco Section and to pay his expenses, but at the meeting at which Secretary Dunlap addressed the Chapter a majority of the active members attended.

In the spring the Chapter arranged for an inspection trip through the Niles Canyon, principally for the inspection of bridges.

An organization has been effected for the publishing of Directory and Year Book in 1924 which will be a complete directory of all the alumni of this Chapter.

The plans of the Chapter for the redesigning of the Civil Engineering Library as to the arrangement of tables and lighting, were accepted and have been put into effect by the Administration Board.

### THE SYRACUSE

The meetings have taken the form of noon-day luncheons once each month. The plan has been, as far as possible, to have the talks given by the members themselves, taking as their subjects some items of interest coincident with their work during the summer.

### West Virginia

Particular emphasis is laid on the importance of public speaking, and students are required to deliver their addresses from notes rather than read them.

### New Student Chapters

There are at the present time 65 Student Chapters, 12 of which were organized during the year:

College of the City of New York Student Chapter  
 George Washington University Student Chapter  
 Kansas State Agricultural College Student Chapter  
 Marquette University Student Chapter  
 Oklahoma Agricultural and Mechanical College Student Chapter  
 Ole Mississippi Engineers (University of Mississippi) Student Chapter  
 Rice Institute Student Chapter  
 University of Alabama Student Chapter  
 University of Michigan Student Chapter  
 University of Nevada Student Chapter  
 University of North Dakota Student Chapter  
 University of Tennessee Student Chapter

### FINANCES

During the past year it was decided to carry only the actual balance necessary in the bank and to invest the funds released. The excess of income over expenditure has been invested in U. S. Treasury Notes. Thus, notwithstanding the payment of \$18 037.97, the entire cost of altering and refurnishing the Fifteenth Floor, which was met out of current funds, \$25 015.63 worth of Treasury Notes was purchased. It will be noted that at the end of the year 1922, there was a cash balance of \$46 974.74 and at the end of the current year, \$36 668.30.

The entire amount now invested in bonds and U. S. Treasury Notes amounts to \$62 022.88. This gives ample protection to the Society trust funds amounting to \$38 890.78 and provides in addition a Reserve Fund of \$23 132.10.

The reports of the Secretary and the Treasurer are appended.

By order of the Board of Direction.

JOHN H. DUNLAP, *Secretary.*

January 14, 1924.

## REPORT OF THE SECRETARY FOR THE

TO THE BOARD OF DIRECTION OF THE  
 GENTLEMEN:—I have the honor to present a statement of Receipts and Disbursements for the fiscal year of the Society, ending December 31, 1923. There is also appended a general Balance Sheet showing the condition of the affairs of the Society.

Respectfully submitted,

JOHN H. DUNLAP,

Secretary.

## RECEIPTS

Balance on hand January 1, 1923		\$46 974.79
Entrance Fees	\$16 915.00	
Current Dues	144 950.61	
Past Dues	11 236.84	
Advance Dues	51 053.78	
Compounding Dues	825.00	
Sale of Publications	5 092.04	
Binding of Transactions	7 785.33	
Badges	4 856.00	
Certificates of Membership	759.12	
Annual Meeting	4 854.75	
1923 Dues Collected for Power Division	243.80	
1924 Dues Collected for Power Division	92.00	
Interest on Bank Balance	1 188.68	
Interest on Investments	2 906.15	
Postage	128.49	
Miscellaneous	2 024.15	
Rent from 57th St. Property	22 703.32	
Estate of Hiram F. Mills	1 000.00	
From Engineering Foundation	2 000.00	
To Committee on Stresses in Railroad Track	5 500.00	
To establish The Rudolph Hering Medal	1 127.72	
To Eads Memorial Fund	558.00	
Maturity of \$10 000 4½% U. S. Treasury Notes	10 000.00	297 300.78

## FINANCES

During the past year it was decided to carry only the actual balance necessary to the bank and to invest the funds released. The excess of income over expenditures has been invested in U. S. Treasury Notes. Thus

*Cash on Hand	\$40 026.54	
Petty Cash (in hands of Secretary)	2 500.00	\$42 526.54
Unexpended Balance of Committee on Stresses in Railroad Track	1 615.25	
Unexpended Balance of The Eads Memorial Fund	2 833.00	

1923 there was a balance of \$46 974.79 and at the end of the current year

\$46 974.79. The entire amount now invested in bonds and U. S. Treasury Notes amounts to \$82 923.88. This gives ample protection to the Society's funds amounting to \$38 897.78 and provides in addition a Reserve Fund of \$23 123.10. The reports of the Secretary and the Treasurer are appended hereto. It is recommended that the Board of Direction approve the same.

By order of the Board of Direction  
 JOHN H. DUNLAP, Secretary  
 January 11, 1924.



## YEAR ENDING DECEMBER 31, 1923.

## AMERICAN SOCIETY OF CIVIL ENGINEERS.

## DISBURSEMENTS.

Salaries of Officers.....	\$15 100.00	
Retirement Allowances.....	7 500.00	
Clerical Help.....	47 580.12	
Publications.....	68 908.42	
Binding of Transactions.....	4 629.80	
General Printing.....	5 943.10	
Badges.....	3 041.00	
Certificates of Membership.....	489.75	
Annual Prizes.....	353.97	
Annual Meeting.....	7 500.49	
Annual Convention.....	1 485.13	
Annual Spring Meeting.....	1 122.54	
Annual Fall Meeting.....	1 577.51	
Monthly Meetings.....	978.17	
Local Sections.....	6 305.00	
Technical Divisions:		
Sanitary Engineering.....	710.46	
Power.....	425.59	
Irrigation.....	52.87	
Highway.....	311.70	
City Planning.....	1.46	
Travelling Allowances for Officers.....	14 509.82	
" Standing Committees.....	736.53	
Work of Committees.....	10 290.00	
Reading Room.....	492.78	
Employment Service.....	3 253.75	
Office Supplies.....	2 985.60	
Postage.....	10 374.90	
Furniture.....	3 508.81	
Current Business.....	5 002.34	
U. E. S.:		
General Assessment.....	7 372.96	
Library.....	8 000.00	
Telephone and Incidentals.....	1 015.44	
John Fritz Medal Board.....	250.00	
Interest on Mortgage.....	10 000.00	
Premium on Fire Insurance.....	306.25	
Miscellaneous.....	1 712.00	
Purchase of Bonds.....	35 015.63	
Accrued Interest.....	74.18	
Eads Memorial Fund.....	651.25	
Alteration and Furnishing of 15th Floor.....	18 037.97	
To Petty Cash Account.....	2 500.00	
	<u>\$310 107.27</u>	
Less Amount transferred to Petty Cash Account.....	2 500.00	\$307 607.27
December 31, 1923: Cash on Hand*.....		<u>36 668.30</u>
		<u>\$344 275.57</u>
*Society Funds.....	\$19 553.36	
Petty Cash (in hands of Secretary).....	5 000.00	\$24 553.36
For Committee on Stresses in Railroad Track.....	7 115.25	
For Committee on Steel Column Research.....	796.42	
For Eads Memorial Committee.....	2 739.75	
1923 Dues collected for Power Division.....	243.80	
1924 Dues collected for Power Division.....	92.00	
To Establish the Rudolph Hering Medal.....	1 127.72	
	<u>\$36 668.30</u>	

## GENERAL BALANCE SHEET

## ACCOMPANYING REPORT

ASSETS			
<i>Real Estate :</i>			
One-fourth interest in U. E. S. real estate, 25 to 33 West 39 Street, New York City.....	\$491 642.36		
Property at 218 to 220 West 57 Street, New York City : .....	533 019.58	\$1 024 661.94	
<i>Equipment :</i>			
Furniture and office equipment.....	\$51 045.12		
Less reserve for depreciation.....	20 318.18	30 726.94	
<i>Library :</i>			
Cash expended for books.....	\$22 122.22		
Donations (estimated).....	72 310.83	94 433.05	
<i>Investments :</i>			
\$10 000 4½% New York City bonds (at par).....	\$10 000.00		
27 300 4½% Liberty Bonds (at cost).....	27 007.25		
25 000 4½% U. S. Treasury Notes (at cost).....	25 015.63	62 022.88	
<i>Working Assets :</i>			
Publications on hand (at cost) .....	\$20 177.51		
Unexpired insurance premium.....	326.48	20 503.99	
<i>Current Assets :</i>			
Cash on hand.....	\$19 553.36		
Petty cash, in hands of Secretary...	5 000.00	\$24 553.36	
For Committee on Stresses in Railroad Track....	7 115.25		
“ “ on Steel Column Research .....	796.42		
For Eads Memorial Committee.....	2 739.75		
1923 dues collected for Power Division.....	243.80		
1924 “ “ “ “ “ .....	92.00		
Received to establish the Rudolph Hering Medal.	1 127.72	36 668.30	
Due from members.....		28 409.46	
“ “ non-members.....		1 006.65	
Interest accrued on investments to December 31, 1923 .....		429.37	
		<u>\$1 298 662.58</u>	

We have audited the accounts of the AMERICAN SOCIETY OF CIVIL estimate of the property valuation is correct), we certify that, in our opinion, Society at that date.

NEW YORK, January 11, 1924.

REPORT OF THE TREASURER OF THE  
AMERICAN SOCIETY OF CIVIL ENGINEERS  
FOR THE YEAR ENDING DECEMBER 31, 1923.

## LIABILITIES

1924 dues paid in advance (including \$92 for Power Division).....	\$51 145.78
Interest accrued on mortgage to December 31, 1923.....	4 166.70
Unexpended balance of Committee on Stresses on Railroad Track.....	7 115.25
“ “ “ “ “ Steel Column Research.....	796.42
Unexpended balance Eads Memorial Fund.....	2 739.75
1923 dues credited to Power Division.....	244.00
Received to establish The Rudolph Hering Medal.....	1 127.72
Mortgage payable, due February 1, 1929.....	200 000.00

## Funds:

Herbert Steward Library Fund.....	\$ 2 000.00
Joseph G. Swift “ “.....	1 000.00
Compounding Dues Fund.....	15 480.00
Norman Medal Fund.....	1 000.00
Rowland Prize Fund.....	1 222.50
Collingwood Prize Fund.....	1 000.00
Arthur M. Wellington Prize Fund.....	2 150.00
Fellowship Fund.....	13 038.28
Hiram F. Mills Legacy.....	2 000.00
Reserve Fund.....	23 132.10
	62 022.88

Surplus ..... 969 304.08

\$1 298 662.58

ENGINEERS for the year ended December 31, 1923, and (assuming that the the above balance sheet sets forth correctly the financial condition of the

LYBRAND ROSS BROS. & MONTGOMERY,

Accountants and Auditors.

**REPORT OF THE TREASURER OF THE  
AMERICAN SOCIETY OF CIVIL ENGINEERS  
FOR THE YEAR ENDING DECEMBER 31, 1923.**

In compliance with the provisions of the Constitution, I have the honor to present the following report:

Cash on Hand January 1, 1923..... \$46 974.79

**RECEIPTS**

From current sources, January 1 to December 31,		
1923 .....	\$254 075.94	
Rent from 57th St. Property.....	22 703.32	
To Eads Memorial Fund.....	558.00	
1923 Dues collected for Power Division.....	243.80	
1924 Dues collected for Power Division.....	92.00	
Final installment of Hiram F. Mills Legacy.....	1 000.00	
From Engineering Foundation.....	2 000.00	
To Committee on Stresses in Railroad Track.....	5 500.00	
To establish the Rudolph Hering Medal.....	1 127.72	
Maturity of Bonds.....	10 000.00	\$297 300.78

**DISBURSEMENTS**

Payment of bills by audited vouchers for current business, January 1 to December 31, 1923.....	\$246 672.41
Local Sections .....	6 305.00
Technical Divisions .....	1 502.08
Alteration and Furnishing of 15th Floor.....	18 037.97
Purchase of Bonds.....	35 015.63
Accrued interest.....	74.18

Balance on Hand December 31, 1923:

In Garfield National Bank.....	\$31 668.30	
In hands of Secretary.....	5 000.00	36 668.30
		<u>\$344 275.57</u>
		<u>\$344 275.57</u>

Respectfully submitted,

OTIS E. HOVEY,  
Treasurer.



## OF THE TECHNICAL DIVISIONS

## Annual Report of the Power Division for 1923

The Power Division was organized on January 19, 1923, in accordance with the rules laid down by the Board of Direction of the American Society of Civil Engineers.

The work of the Division for the past year was carried on under the direction of the Executive Committee consisting of Messrs. George A. Orrok, *Chairman*, Francis Blossom, N. C. Grover, Edward Hutchins, and F. W. Scheidenhelm.

The following papers were presented at meetings of the Division, which formed a part of the regular programs of the Society:

At the Annual Convention, Chicago, Ill., July 11, 1923: "Power Development in the Middle West", by W. L. Abbot, Chief Operating Engineer, Commonwealth Edison Company, Chicago, Ill., and "Ice Problems at Hydro-Electric Plants", by W. T. Walker, M. Am. Soc. C. E., Construction Superintendent, Northern States Power Company, Minneapolis, Minn.

At the Fall Meeting, Richmond, Va., October 17, 1923: "Interconnection of Southern Appalachian Power Systems", by W. S. Lee, M. Am. Soc. C. E., Chief Engineer, Southern Power Company and the Quebec Development Company, Charlotte, N. C.

These papers aroused extensive interest and varied discussion.

At the Joint Meeting of the Societies of Mechanical, Electrical, and Civil Engineers held in New York, N. Y., on December 7, 1923, the Power Division arranged for the paper on "The Fundamental Problems of Hydro-Electric Development" by John R. Freeman, Past-President, Am. Soc. C. E., and for the discussion by J. P. Hogan and George A. Orrok, Members, Am. Soc. C. E.

During the year, the Executive Committee held four meetings for preparing programs and co-ordinating the work of the Division with that of the Society in completing organization and for the discussion of executive problems.

The financial statement of the Division for the year 1923 is as follows:

*Receipts:*

Appropriation by Society.....	\$750.00
Dues .....	243.80
Total .....	\$993.80

*Disbursements:*

Expenditures for mileage, printing, typing, stationery, and postage.....	\$367.38
Unexpended balance of appropriation reverting to Society .....	382.62
Balance on hand January 1, 1924.....	\$243.80

In explanation, it should be stated that all approved expenditures are paid from the "Appropriation Account", to the limit of that appropriation, before any money is taken from the "Dues Account", the balance of the latter account remaining to the credit of the Division.

The membership of the Division is now 244.

At the end of its first year the Division finds all its organization problems and difficulties overcome and is ready for an intensive and expanding program in 1924, to be of service to all its members.

E. W. MALONEY,  
*Secretary.*

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### Annual Report of the Irrigation Division for 1923

The Irrigation Division of the American Society of Civil Engineers was formed by petition circulated during the fall of 1922, and, on October 5, 1922, during the Fall Meeting of the Society in San Francisco, Calif., a committee, composed of Messrs. C. E. Grunsky, Thomas H. Means, and B. A. Etcheverry, was appointed to draft a plan of organization. This plan was taken up in detail at a meeting of the Division on January 19, 1923, in New York, N. Y., and, at the same meeting, the following Executive Committee was elected: Messrs. B. A. Etcheverry, Thomas H. Means, F. H. Fowler, C. E. Tait, and A. L. Sonderegger. This Committee proceeded later to organize with Mr. Thomas H. Means as Chairman and Mr. F. H. Fowler as Secretary.

It is with great regret that the Committee announces the death of C. E. Tait, M. Am. Soc. C. E., since the original organization.

The Committee has met during the summer and fall of 1922 at irregular intervals to transact such business as was necessary, and, from time to time, the Chairman has had opportunity to consult with Mr. A. L. Sonderegger, the only member of the Committee not resident in San Francisco, Calif., or vicinity.

It was decided at the first meeting that the activities of the Division for the immediate future would be concentrated on the preparation of a series of papers designed primarily for presentation as a Symposium on Irrigation at a meeting of the Society in the West during 1924 or 1925. The proper authorities of the Society have since decided that the meeting at Salt Lake City, Utah, in 1925 will be devoted to "Irrigation". The Executive Committee of the Division, therefore, is making all plans to have a comprehensive series of papers and discussions completed for this meeting.

In order to insure a comprehensive plan, sub-committees have been, or are in the process of being, formed to deal with the following subjects: "Interstate Water Matters", "Duty of Water Studies", "Co-operation between Federal and State Agencies", "Drainage of Irrigated Lands", "Relation of Irrigation to Power Demands", "Irrigation Economics", and "Land Settlement Problems."

The Chairmen of these Sub-Committees are endeavoring to secure a wide geographical representation so that all phases of the respective problems may be thoroughly covered.

The Executive Committee recommends that papers and discussions on irrigation problems presented at all meetings of the Society prior to that at Salt Lake City be confined, as far as possible, to progress reports, etc., regarding the above program, since the concentration of effort will probably lead to far better results.

Attention is particularly directed to the fact that the program for the Irrigation Meeting had been determined by the Division long before it was decided that the meeting of the Society would be held in Salt Lake City, and it is, therefore, of greatest importance that the work of the Program Committees of the Society and the Utah Section be co-ordinated at the earliest possible date, otherwise endless confusion is bound to result.

The Executive Committee has submitted, under separate cover, to the Secretary of the Society a revised constitution, more nearly in line with those adopted by other Divisions than the old Constitution of the Division. It is understood that this will be considered at a meeting of the Division to be held during the Annual Meeting of the Society in New York, N. Y., on January, 1924.

THOMAS H. MEANS, *Chairman*, Irrigation Division,  
F. H. FOWLER, *Secretary*.

### **Annual Report of the Executive Committee of the Sanitary Engineering Division for 1923**

The Executive Committee of the Sanitary Engineering Division was elected by letter-ballot in October, 1922, under Article VII of the By-Laws of the Society. It has held in all, 9 meetings: 2 during the organization period preceding the Annual Meeting of 1923, and 7 during the past year.

The Division has met twice: At the Annual Meeting of the Society in New York, N. Y., and at the Annual Convention in Chicago, Ill., and, following a custom inaugurated in 1920 by many of its original members, a dinner has been held on the evening before the Annual Meetings of 1923 and 1924.

**Constitution.**—The first matter of importance to come before the Committee was the formulation of a set of By-Laws, which were discussed at the Annual Meeting, referred back, revised, approved by the Board of Direction, and, finally, termed "Constitution" in accordance with the practice of the other Technical Divisions, and ratified by the Division at the Annual Convention.

A matter causing considerable discussion was the policy to pursue regarding the admission of Affiliates, for which provision was finally made, although to the present time none has been admitted.

*Status of Sanitary Engineering.*—An address on "The Present Status of Sanitary Engineering" was presented at the Annual Dinner in 1923 by Harrison P. Eddy, M. Am. Soc. C. E.\* Mr. Eddy reviewed in a general way the development of sanitary engineering, mentioned the main branches into which it is subdivided, and formulated the aims which should be pursued by this Division.

Although no formal action has been taken by the Committee officially sanctioning these aims for adoption, they have been tacitly accepted as a guide.

*The Rudolph Hering Medal.*—Early in the year, a proposition was received from Samuel A. Greeley, M. Am. Soc. C. E., offering to raise a sum of money the proceeds from which should be annually applied to the award of a medal to the author of "the best contribution to the *Proceedings* of the Society upon the fundamentals of Sanitary Engineering along the lines outlined by Mr. Eddy."

The project was approved by the Executive Committee of the Division and the Board of Direction of the Society. The designation having been left to the Committee, it was decided to call the prize the "Rudolph Hering Medal."

Rules to govern the award of the Rudolph Hering Medal were drawn up by the Committee† and have been submitted to the Board of Direction for approval.

A total of \$1 512.72 has been contributed for this purpose and has been transmitted to the Secretary of the Society.

*New Jersey Sewage Experiments.*—On May 12, 1923, a letter from the Chairman of the Committee on the New Jersey Sewage Experiment Stations and the President of the New Jersey Sewage Works Association was received, inviting the co-operation of this Division by appointing a representative "to confer and advise in the matter of sewage investigations" already being carried out by the above organizations and the New Jersey State Department of Health.

Charles G. Wigley, M. Am. Soc. C. E., already a member of the New Jersey Sewage Works Association, was appointed to represent the Division, and will present a report of the work being done.‡

*Status of the Sanitary Engineer in the U. S. Public Health Service.*—Early in August, 1923, a communication from L. W. Wallace, Executive Secretary of the Federated American Engineering Societies, to the Secretary of the American Society of Civil Engineers relative to legislation proposed to remedy certain conditions prejudicial to the interests of the Sanitary Engineers of the U. S. Public Health Service was referred by the Board of Direction to the Sanitary Engineering Division; and at about the same time, a letter was received from Sol Pincus, M. Am. Soc. C. E., calling attention to the matter.

A committee was thereupon appointed, consisting of Messrs. George W. Fuller, *Chairman*, Morris Knowles, W. L. Stevenson, and George C. Whipple,

\* *Proceedings*, Am. Soc. C. E., January, 1924, Papers and Discussions, p. 3.

† *Proceedings*, Am. Soc. C. E., December, 1923, p. 697.

‡ See p. 255.



to co-operate with other organizations in an attempt to bring about remedial legislation. This Committee will present a report of its work at this meeting.

*Friction of Sludge.*—Realizing the dearth of accurate information regarding the flow of sludge in pipes and channels and understanding that certain experiments were in progress along these lines, a Committee on the Friction of Sludge was appointed February 23, 1923, consisting of Messrs. Glenn D. Holmes, *Chairman*, Clarence E. Keefer, and Langdon Pearse. A report from this Committee, also, will be presented.\*

*International Conference of Sanitary Engineers.*—Early in October, 1923, the attention of the Chairman of the Division was called by Mr. George W. Fuller to a communication from H. C. H. Shenton, President of the Institution of Sanitary Engineers of Great Britain, urging the co-operation of American engineers in an International Conference of Sanitary Engineers which it was proposed to hold near London, England, in the summer of 1924.

Mr. Fuller urged the appointment of a committee for promoting this matter without delay, and the following members were selected: Messrs. T. Chalkley Hatton, *Chairman*, R. O. Wynne-Roberts, and G. Bertram Kershaw.

In acknowledging the announcement of this action, Mr. Shenton writes: "I feel sure that this Meeting, with the co-operation of the engineers of both countries, will be very pleasant and productive of good results."

*Division Meetings.*—The first meeting of the Division was held on January 16, 1923, immediately after the Annual Dinner. As already mentioned, there was an address by Mr. Harrison P. Eddy, followed by business, chiefly pertaining to the proposed By-Laws.

On January 18, 1923, an inspection was made of the Dyckman Street fine-screening plant.

At the Annual Convention in Chicago, resolutions† were passed on the death of Rudolph Hering, M. Am. Soc. C. E., which were placed on the minutes and a copy was transmitted to Mrs. Hering.

Arrangements for the entertainment of the members of the Division passing through Rochester, N. Y., to the Annual Convention at Chicago, were made by the Rochester Section of the Society, the Rochester Engineering Society, and the Municipal authorities, but owing to a delay in delivering mail, the notices were not received in time to be availed of.

The Local Committee at Chicago, consisting of Messrs. G. C. D. Lenth, *Chairman*, L. K. Sherman, and Langdon Pearse, arranged trips of inspection to pumping stations and intake cribs of the Chicago Water-Works and to sewage disposal plants of the Sanitary District. Through the courtesy of Mr. T. Chalkley Hatton, an all-day trip was made to Milwaukee, Wis., to inspect the new sewage disposal plant and the works of the Allis-Chalmers Company.

*Financial.*—The receipts from the Annual Dinner amounted to \$191.25 and the budget appropriation was \$750.00, making the total receipts, \$941.25.

\* See p. 258.

† *Proceedings*, Am. Soc. C. E., September, 1923, p. 523.

Of this, \$189.00 was expended for the Annual Dinner, \$397.21 for mileage for attendance at meetings of the Executive Committee, \$223.37 for reporting and stenography, \$54.87 for printing, and \$37.26 for stationery, postage, and miscellaneous expenses, making a total of \$901.71 and an unexpended balance of \$39.54.

(Signed) KENNETH ALLEN, *Chairman*,  
J. FREDERICK JACKSON,  
GEORGE T. HAMMOND,  
X. H. GOODNOUGH,  
HARRISON P. EDDY,  
*Executive Committee.*

### Annual Report of the Highway Division for 1923

The organization meeting of the Highway Division of the American Society of Civil Engineers was held in New York, N. Y., on January 19, 1923. At this meeting, the field of work of the Division was discussed, tentative by-laws were adopted, and Messrs. C. J. Bennett, W. K. Hatt, Clifford Older, H. G. Shirley, and C. D. Curtiss were nominated for membership on the Executive Committee of the Division. These nominees were later elected by letter-ballot and have since served in this capacity. The Executive Committee elected Dr. W. K. Hatt, Chairman, and C. D. Curtiss, Secretary.

The first meeting of the Highway Division was held at the Drake Hotel, Chicago, Ill., on July 11, 1923, in connection with the Fifty-third Annual Convention of the Society. At this meeting, which was presided over by Chairman Hatt, of the Executive Committee, the future activities of the Division and a revision of the Constitution tentatively adopted at the organization meeting in New York were discussed. The consensus of opinion of those present was that the Highway Division could best serve the members of the Society in general and of the Division in particular through the medium of meetings of the Division held in connection with the quarterly meetings of the Society and by making use of the *Proceedings* and *Transactions* in putting before the membership papers and discussions covering important highway subjects and outstanding developments in highway research.

The second meeting of the Division was held at the Jefferson Hotel, Richmond, Va., on October 17, 1923, in connection with the Fall Meeting of the Society. This meeting was presided over by Chairman Hatt, of the Executive Committee, who addressed the meeting relative to the activities and functions of the Division. This was followed by a paper on "The Development of State Highway Systems" by Charles M. Upham, Assoc. M. Am. Soc. C. E., which was illustrated with lantern slides. Mr. Upham's paper was discussed by George H. Biles, M. Am. Soc. C. E. This was a very successful meeting, about 135 being present.

The following committee was appointed to nominate members of the Executive Committee for 1924: Dean Anson Marston, Chairman, C. M. Upham, A. B. Fletcher, G. H. Biles, and E. R. Olbrich. This Committee re-nominated the members of the Executive Committee, and the names were later passed to members of the Division for letter-ballot.

Up to the present time, the Executive Committee has held three meetings. The first was held at Chicago, on July 11, 1923, at the time of the first meeting of the Division.

The second meeting was held in Washington, D. C., on July 27, 1923. In Washington, the Committee met with Richard L. Humphrey, Chairman of the Committee on Technical Activities and Publications of the Society, and Messrs. A. J. Saville and C. C. Robinson, representing the Virginia Section, and assisted in planning the program for the Fall Meeting of the Society in Richmond, Va., which was devoted largely to papers and discussions on highway subjects. The Committee also considered the advisability of holding a meeting of the Highway Division at the time of the Annual Meeting of the Society in New York, with a program devoted to highway research.

The third meeting of the Committee was held at the time of the Fall Meeting of the Society in Richmond, on October 17, 1923. At this time, it was decided to have a meeting of the Division in connection with the Annual Meeting in New York, with papers on highway research by A. T. Goldbeck, Assoc. M. Am. Soc. C. E., Chief, Division of Tests and Research, U. S. Bureau of Public Roads, and Clifford Older, M. Am. Soc. C. E., Chief Highway Engineer, Department of Public Works and Buildings, State of Illinois.

It is felt that a satisfactory beginning has been made in the year which has elapsed since the Division was organized, and it is believed that the Division will grow in usefulness in serving the members of the Society interested in this important branch of Civil Engineering. The large enrollment which has been secured without any campaign or solicitation indicates clearly the interest of the members of the Society in the subject of highways and justifies the feeling that the future of the Division is assured.

O. D. CURTISS,

*Secretary, Executive Committee.*

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### Annual Report of the City Planning Division for 1923

The City Planning Division of the American Society of Civil Engineers respectfully submits to the Board of Direction this report of operations for the first half year of its existence.

Applications were made to the Board of Direction in June, 1923, by two groups of members for approval of the formation of a City Planning Technical Division of the Society. The first of these, an Eastern group, was headed by Nelson P. Lewis, M. Am. Soc. C. E., Past-President of the National Conference of City Planning; the second group consisted mainly of mem-

bers located in Chicago, Ill., and vicinity. The number of names on each list exceeded twenty, the requisite number of petitioners for this purpose.

The Board of Direction approved the request and a tentative organization of the Division was effected at Chicago on July 12, 1923, with the choice of a temporary Executive Committee to serve until the Annual Meeting in 1924. This Committee was comprised of Nelson P. Lewis, New York, N. Y., Chairman, Charles B. Ball, Chicago, Ill., Secretary, Carl E. Grunsky, San Francisco, Calif., Harland Bartholomew, St. Louis, Mo., and E. A. Fisher, Rochester, N. Y.

The adoption of a Provisional Constitution and a brief discussion of future programs concluded the Chicago session.

The activities of six months have resulted in the acquisition of a number of members so that the present enrollment is 92.

It is not expected that the Division will equal in size some of the other Technical Divisions, but it should attract to its membership many of those who have an interest in the subject.

A secondary purpose of the Division, namely, to emphasize the function of the civil engineer as a city planner has enlisted the cordial support of Past-President Loweth, a number of members of the Board of Direction, and Secretary John H. Dunlap.

A circular letter was sent out on December 17, 1923, from the New York office announcing the meetings to be held in connection with the Annual Meeting of the Society, at which a permanent organization would be accomplished, a program presented, and a general discussion of topics for papers would be considered.

Some consideration has been given to proposed programs for future meetings, and it is believed that the membership could furnish a considerable amount of this material well adapted to this purpose.

At the Annual Meeting of the Division on January 17, 1924, the following were elected as members of the Executive Committee: Messrs. Nelson P. Lewis, New York, N. Y., *Chairman*, Charles B. Ball, Chicago, Ill., *Secretary*, Harland Bartholomew, St. Louis, Mo., E. A. Fisher, Rochester, N. Y., and Morris Knowles, Pittsburgh, Pa.

NELSON P. LEWIS,

*Chairman*, Executive Committee.

CHARLES B. BALL,

*Secretary*.



## Progress Reports of the Technical Divisions

### Report to the Sanitary Engineering Division, Relative to the New Jersey State Sewage Experiment Station

*Historical.*—In 1899, the State of New Jersey created a State Sewerage Commission, the statute providing for the establishment of a Sewage Experiment Station, probably with the idea of supplementing the valuable work of the Massachusetts State Board of Health in the development of sewage treatment principles and methods. Unfortunately, the appropriations did not allow of the establishment of such an Experiment Station because of more urgent work. The establishment of a Sewage Experiment Station was not again seriously revived until 1918 when, because of the partial failure of a new type of sewage treatment works and the generally unsuccessful attempts to discover the causes and remedies for the unsatisfactory conditions, it became apparent that there was a vast amount of information yet to be obtained before it could be said that sewage treatment works were thoroughly understood.

It had been noticed that in sprinkling filters and contact beds there was a tremendous amount of animal life that appeared to have a marked influence on the rate of operation and quality of the effluent. The question immediately arose as to what connection these animals (worms, etc.) had with the transmutation of offensive material into inoffensive compounds.

The writer believed that if more was known about the particular functions of bacteria, animals, and plants, and the most desirable environment for each, it might be possible to make these workers in a sewage treatment plant more efficient. This would diminish the cost of the factory in which they work and improve their living conditions by eliminating the interference of other organisms occupied in divergent occupation, and permit them to operate on a greater production basis. It appeared possible that after letting fungi, animals, or bacteria operate for a time, the resulting mass of solids could pass on to certain other bacteria or animals for final digestion, and the liquids to nitrifying bacteria, and, finally, to algae or kelp which would store the nitrogen and after being harvested would be used as fertilizer.

The men of the State Agricultural Experiment Station became interested and largely through their efforts, assisted by the New Jersey Sewage Works Association and those of the State Department of Health, a small appropriation was obtained for sewage experimental purposes. Work at the Station began in September, 1921, and was re-organized with the present staff in October, 1922.

*Organization and Work.*—The Experiment Station is under the joint jurisdiction of the State Department of Health and the New Jersey Agricultural Experiment Station. These organizations have freely sought advice and suggestions from a committee from the New Jersey Sewage Works Association which was appointed at their request.

The investigators had no preconceived views about the work of certain groups of organisms in sewage purification, although a comprehensive bibli-

ography of the subject was made and literature was studied for information. They were familiar, however, with many of the organisms, because of their studies of soil fertility and fertilizers. For example, they had been investigating the digestion of cellulose in connection with the use of straw as a fertilizer, which study was somewhat similar to that of the digestion of cellulose in sewage sludge. They were also familiar with nitrifying organisms living under different conditions.

It seems to the writer that there is considerable advantage in the fact that investigators have undertaken the study of the problem of sewage treatment in a purely scientific manner.

They have given considerable time and study, however, to important matters arising at the Joint Sewage Treatment Works at Plainfield, N. J., where most of their studies have been made. They studied the small fly that develops in sprinkling filters and found a method of preventing its development. An alum treatment of sludge has recently been demonstrated, that will permit the use of smaller sludge beds, or rather the drying of more sludge per year on a unit of sludge bed area.

At present, the personnel of the Experiment Station consists of a Chief of Sewage Investigation, Research Zoologist, Research Bacteriologist, Research Chemist, Research Botanist, one Laboratory Assistant, and one stenographer.

The Control or Executive Committee consists at present of the State Entomologist, the Chief of Sewage Investigation, and the Bacteriologist of the State Department of Health.

An Advisory Committee of the New Jersey Sewage Works Association consists of two sanitary engineers, a chemist in charge of the Plainfield Treatment Works, and a practical sewage plant operator.

*Scope of Investigations.*—The program of investigations to be undertaken is comprehensive and may be briefly stated as follows:

#### Chemical Studies:

Production of  $\text{NH}_3$ ,  $\text{N}_2$ ,  $\text{CO}_2$ , and  $\text{CH}_4$ , and variations.

Digestion changes in sludge and scum.

Digestion of cellulose.

Study of nitrogen transformation.

Study of sulphur transformation.

Study of pH changes in plant.

#### Protozoological Studies:

Mechanical and physiological work of opercularia.

“ “ “ “ “ *Nematoda* and *Annelida* worms.

Study of organism *Carchesium*.

Census of organisms in Imhoff tank.

Studies of work done by ciliates and flagellates in Imhoff tank.

Study of methods of control of numbers of specific organisms.

#### Botanical Studies:

Census of fungi and algae in Imhoff tank and sprinkling filter.

Classification of plants found in filter and tank and their physiological activities.

#### Bacteriological Studies:

Digestion of protein and effect of hydrogen ion concentration.

Similar studies as to nitrification and denitrification.

Sulphur compounds produced by bacteria.

Digestion of cellulose and carbo-hydrates.

Relative importance of aerobic and anaerobic bacteria.

Isolation and identification of important bacteria in sewage treatment.

#### Practical Studies:

Value of sludge as fertilizer treated and untreated.

This is an extensive plan of investigation from which very valuable information should be obtained.

Some of the more important results of studies made up to the present time will now be mentioned. These results should be taken more as indications rather than final conclusions, as they are based on a comparatively short study of a single sewage treatment plant.

*Imhoff Tanks.*—The greater quantity of ammonia in the effluent is caused by diffusion of ammonia from the sludge compartment.

The effluent is, however, less alkaline than the influent, suggesting that some acid compound also diffuses out of the sludge digestion chamber.

No nitrites or nitrates have been found, up to the present, in the effluent or sludge, although nitrifying organisms were found in the tank by the bacteriologist.

No hydrogen was found in the gas from the Imhoff tank.

Carbon dioxide is found to be less in the gas at the bottom than at the top of the tank, and this gas decreases in volume from inlet to outlet.

By the addition of 1½ lb. of aluminum sulphate, Imhoff tank sludge may be dried in approximately one-half the ordinary time, the water content of the sludge reduced and odors prevented.

In the digestion chamber, the proteolytic organisms, hydrogen-sulphide producers, and nitrate-reducing organisms were most abundant. Sulphate organisms and nitrifying bacteria were also present. The cellulose-digesting organisms were found chiefly in the digestion chamber, but were the least numerous of the groups of bacteria studied.

When the Imhoff tank was first operated, the solid content of the "liquid" between the scum and the sludge increased from 0.22% in 9 days to 2.5%, or about one-half as much solids as in the sludge itself. This increase occurred without any change in position or concentration of the sludge.

The rate of gas ebullition increased in the same period from 11 cu. cm. per liter per hour, to 90 to 100 cu. cm. per liter of tank content per hour.

The maximum concentration of solids in the liquid remained constant for 15 days, but 7 days later it had dropped to 1 per cent. During these periods, the ash of the solids had increased from 38% to 41% and 43%; the carbon dioxide decreased from 34% to 29%, and the alkalinity of the liquid increased from 7.3 to 7.6 parts per 100.

These facts would indicate that after 25 days the tank was operating properly.

*Sprinkling Filter.*—The greater part of effective nitrification takes place at the bottom of the filter. Possibly, this is due to the collection of solids there.

Free ammonia is removed chiefly at the bottom of the filter. As the thickness of the film on the stones of the filter increases, the number of ciliates and worms increases, but they are discharged during the unloading period with the loosened film. The opercularia on the other hand increase rapidly after the unloading of the filter, and appear to be the most important protozoa in the filter. Nitrification appears to be better as they disappear. This may be due to the fact that they consume large numbers of bacteria.

Many fungi are found in the heavy film.

The fluctuation in numbers of bacteria did not coincide with seasonal variations.

Laboratory experiments indicate the possibility of killing certain forms of protozoa in case they are found to be detrimental.

The sloughing of the film begins at the top of the filter.

A specific type of protozoa rapidly increases in numbers during the unloading period. When the first indication of the loosening of the film in the top of the bed became apparent, the number of small flagellates was about 4 500; by the time the unloading was noticeable in the effluent, the numbers had increased to 355 000, that is, eight times the original number.

As pointed out, these indices must be taken more as guide-posts, designating further lines of study, than as the final conclusions of the investigators.

For the Sanitary Engineering Division,

C. G. WIGLEY.

### **Progress Report of the Committee of the Sanitary Engineering Division, on the Friction of Sludge**

The difficulties inherent in the nature of sewage sludge have been one of the factors in retarding the progress of the Committee in developing data concerning the friction of sewage sludge when pumped through long pipe lines.

The heterogeneous mixtures covered by the term, "sewage sludge", apparently do not lend themselves to simple studies and observations. Extended work will be required before the Committee can render a final report.

Nevertheless, the members of the Committee feel impelled to report that a certain amount of progress has been made to date. They have had considerable correspondence with engineers who evince great interest in the problem, and are more than anxious to co-operate for the purpose of developing definite data.

Mr. William Clifford, Manager and Chemist of the Sewage Outfall Works at Wolverhampton, England, has shown a particular interest in the subject, and is especially helping to develop the viscosimeter phase of the study.

The viscosimeter phase of attacking the problem of friction of sewage sludge offers an angle of approach, which although it may not prove fruitful, is of great interest. Studies have been made with a viscosimeter built on the principle of the Saybolt viscosimeter which is used to a great extent in the fuel-oil industry for determining the viscosity of lubricants. Data are avail-



able in the engineering press for the translation of the viscosity as determined by the Saybolt viscosimeter into the equivalent friction when pumping.

Experiments on actual sludge pumping installations have been made, under the supervision of members of the Committee, at Toronto, Ont., Canada, and Baltimore, Md. The results have not yet been developed to their complete satisfaction, but, in addition to serving as a guide for additional experiments, the data obtained will help the development of some useful information on the subject.

The Committee is also preparing a digest of all available and known publications containing information on the problem. It is also seeking to collect as nearly complete as possible a summary of all available data and will welcome correspondence with any one having information on this subject.

The Committee is hopeful of conducting further experiments at existing treatment plants and desires to interest others in similar work. It is believed that data of much value can be obtained at a number of plants, and the Committee will be very glad to co-operate as far as possible. It is felt that the experience gained in the experimental work at Baltimore and Toronto may be of assistance in overcoming some of the difficulties encountered by others in obtaining experimental data.

Such information as is available would seem to indicate the following tentative conclusions:

1.—That friction losses for undigested sewage sludge with moisture content exceeding 96%, do not differ greatly from those for water, but increase quite rapidly with a decrease in the percentage of moisture below this limit.

2.—That friction losses for heavy paper pulp stock, which to some extent resembles sewage sludge, increase rapidly as the moisture content is reduced below 98 per cent.

Your Committee will endeavor to present a further progress report at the next meeting of the Sanitary Division.

Respectfully submitted,

GLENN D. HOLMES, *Chairman*,

C. E. KEEFER,

LANGDON PEARSE.

January 17, 1924.

## Progress Reports of Special Committees of the Society

### Progress Report of the Special Committee on Impact in Highway Bridges\*

TO THE AMERICAN SOCIETY OF CIVIL ENGINEERS:

The Committee has held three meetings during 1923, the first in Chicago, Ill., on April 7, the second in Ames, Iowa, on August 27, and the third in Chicago on November 7. At the first meeting, Past-President Talbot, Chairman of the Research Committee, was in attendance for 3 or 4 hours and President Loweth for about 1 hour. These men were of great assistance in giving the viewpoint of committee work of the Society in general and in discussing some of the policies for this particular Committee.

The second meeting was held in Ames for the purpose of acquainting the members of the Committee with the methods, the instruments, and the results of the co-operative work under way between the U. S. Bureau of Public Roads, the Iowa State Highway Commission, and the Engineering Experiment Station of Iowa State College.

The third meeting, held in Chicago, was devoted primarily to the discussion of available data, especially of those concerning instruments, in making an estimate for the work of the Committee for 1924, and in planning this report for the current year.

The only active field work of which the Committee has knowledge is that previously mentioned at Ames. Co-operative work was begun at that place during the summer of 1922 by the U. S. Bureau of Public Roads, the Iowa State Highway Commission, and the Engineering Experiment Station of Iowa State College. An important item at that time was the adaptation of existing instruments, or the development of new instruments for measuring dynamic stresses. A number of instruments were tested with the result that only those best adapted to the purpose were used during 1923.

A description of the 1922 work, discussion of the various instruments used, and some of the results have been published as *Bulletin No. 63* of the Engineering Experiment Station of Iowa State College. The greater part of the *Bulletin* was included in the report† of this Committee for 1922.

Active field work was conducted at Ames, by a force of five men, from July 1 to September 15, 1923, on the following structures:

1.—A 150-ft. span, 20-ft. roadway, through curved chord steel truss, with a concrete floor on steel stringers, known as the Skunk River Bridge on the Lincoln Highway, about  $\frac{1}{4}$  mile east of Ames.

2.—A 33-ft. span, 20-ft. roadway, consisting of a concrete floor on steel stringers. This is an approach span to the main Skunk River Bridge.

\* Presented to the Annual Meeting, January 16, 1924.

† *Proceedings*, Am. Soc. C. E., March, 1923, Papers and Discussions, p. 457.

3.—A 70-ft. span, 24-ft. roadway, through plate girder, with a concrete floor on steel stringers. This is known as the Squaw Creek Bridge on the Lincoln Highway and is within the city limits of Ames.

4.—A 40-ft. pony truss bridge, 18-ft. roadway, with a reinforced concrete slab resting directly on the transverse floor-beams, on the county road near Roland, Iowa, about 20 miles from Ames.

The loads used throughout the season consisted of two 15-ton trucks with solid rubber tires, with about 12 tons on the rear axles and 3 tons on the forward axles. A 10-ton, Holt, caterpillar tractor was used for a few readings on Structures 1 and 2.

The season's work was confined to the stringers of Structures 1, 2, and 3, the floor-beams of Structures 1, 3, and 4, the web members of Structures 1 and 4, the chords of Structure 4, and the girder flanges of Structure 3. In addition to impact readings over 1-in. and 2-in. obstructions and on a smooth floor, distribution data were obtained for static loads, which show the actual unit stresses in the various stringers of Structures 1, 2, and 3, for one and for two trucks.

In addition to the instruments used in the 1922 work, a new instrument, developed by the U. S. Bureau of Standards, was made available through the courtesy of that Bureau for one week in September. This instrument consists of six electrical remote-reading and recording strain gauges in which records of all six gauges are photographed on one roll of paper.

Before the field work was begun, the instruments were calibrated for static stresses. No suitable equipment was then available for dynamic calibrations. Two impromptu devices were developed later which have given, within reasonable limits, positive as well as comparative calibrations under rapidly changing conditions. These devices consisted of an impact machine in which a weight was dropped on a tension bar to which the instruments were attached; and a vibrating device which produced known changes in length in very short but known increments of time. The work of calibration, although not completed, has been sufficient to insure a reasonably accurate interpretation of results. The results will be compiled as soon as practicable.

The electrical remote-reading and recording instrument developed by the U. S. Bureau of Standards gave such promise of adaptability to the work of the Committee that it seemed likely to prove satisfactory under the severe conditions that cause overthrow in some of the other instruments. The Chairman, therefore, was authorized by the Committee to make a trip to Washington, D. C., to interview the officials of the U. S. Bureau of Public Roads and the U. S. Bureau of Standards, in regard to the development and use of instruments and to determine whether it would be practicable to arrange to obtain a Bureau of Standards instrument to add to the present equipment for future work. The Director of the U. S. Bureau of Standards gave assurance that the Bureau would be able to furnish the plans and arrange for the manufacture of instruments which could become the property of the purchaser on the payment of the cost. In view of the importance

of this matter, the Committee recommends the purchase by the Society of such an instrument, to consist of a set of twelve extensometers all recording on one roll of photographic paper.

It is the intent of the Committee, if the purchase of this instrument should be approved, to assign it for the coming year primarily to the one project which is actively under way and to divert it to other places as the work of the Committee would indicate.

**A. H. FULLER, Chairman,**

**A. R. EITZEN,**

**E. F. KELLEY,**

**F. E. TURNEAURE.**

**OCTOBER 17, 1923.**



## Progress Report of the Special Committee on Stresses in Structural Steel\*

TO THE BOARD OF DIRECTION,

AMERICAN SOCIETY OF CIVIL ENGINEERS:

The following is the progress report of your Special Committee on Stresses in Structural Steel:

- 1.—The Committee has held five meetings during the past year.
- 2.—Structural steel specifications of Germany, Belgium, Great Britain, Switzerland, France, Holland, Italy, and Sweden are being translated, and the results will be studied and digested.
- 3.—The relation of the strength of the test specimens to that of full-sized members has been and is still being investigated.

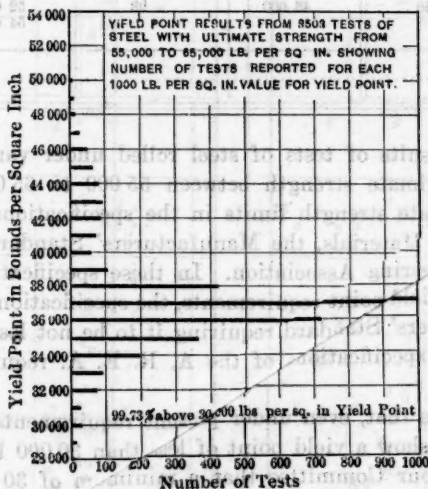


FIG. 1.

4.—An investigation of the results of mill tests has been made with the co-operation of four of the leading steel companies. In this investigation, 3 503 tests from 6 mills, requiring the classification of 28 000 characteristics has been tabulated in such manner as to give data on the average chemical analysis, yield point, ultimate strength, elongation, and reduction of area. This has been done for:

- (a) Results from each mill, averaged for each of six classes of material, for each thickness.
- (b) Results from each mill, averaged for all classes of material combined, for each thickness.
- (c) Results from all mills and classes of material combined, averaged for each thickness.

\* Presented to the Annual Meeting, January 16, 1924.

The tabulated results have not as yet been completely digested for their bearing on the problem before the Committee, but it is thought that they are of sufficient interest to be presented at this time. Table 1 gives the numbers of tests falling within certain yield point ranges, Fig. 1 shows the same graphically, and Figs. 2 to 6, inclusive, show the variations in the yield point for each of the classifications enumerated.

TABLE 1.—SPECIAL FIGURES ON YIELD POINT.

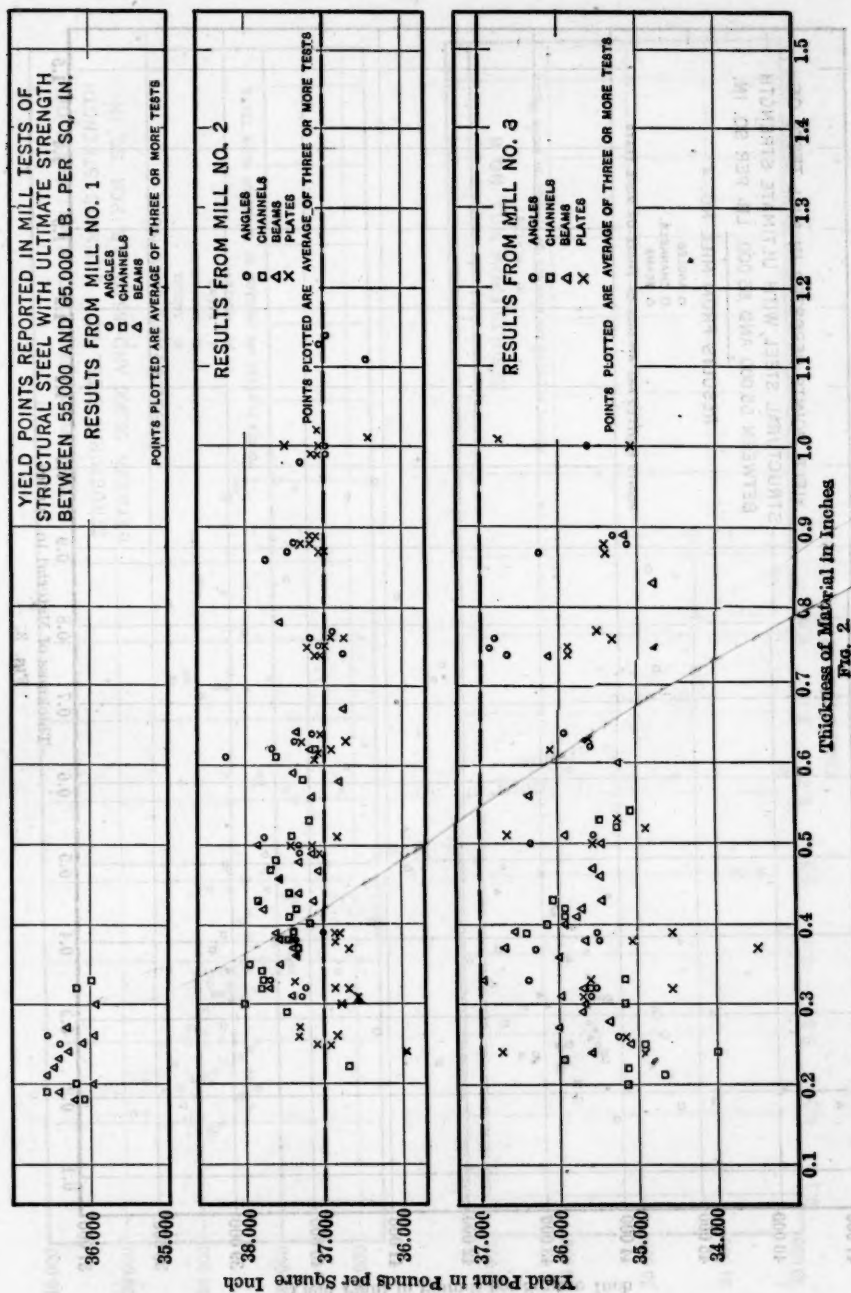
Yield point.	Number of tests.	Yield point.	Number of tests.	Yield point.	Number of tests.
28 000	5	36 000	718	44 000	78
29 000	8	37 000	1 000	45 000	60
30 000	28	38 000	414	46 000	49
31 000	21	39 000	103	47 000	19
32 000	59	40 000	55	48 000	8
33 000	90	41 000	64	49 000	4
34 000	196	42 000	62	50 000	3
35 000	356	43 000	93	53 000	1
				54 000	1
Total.....					3 503

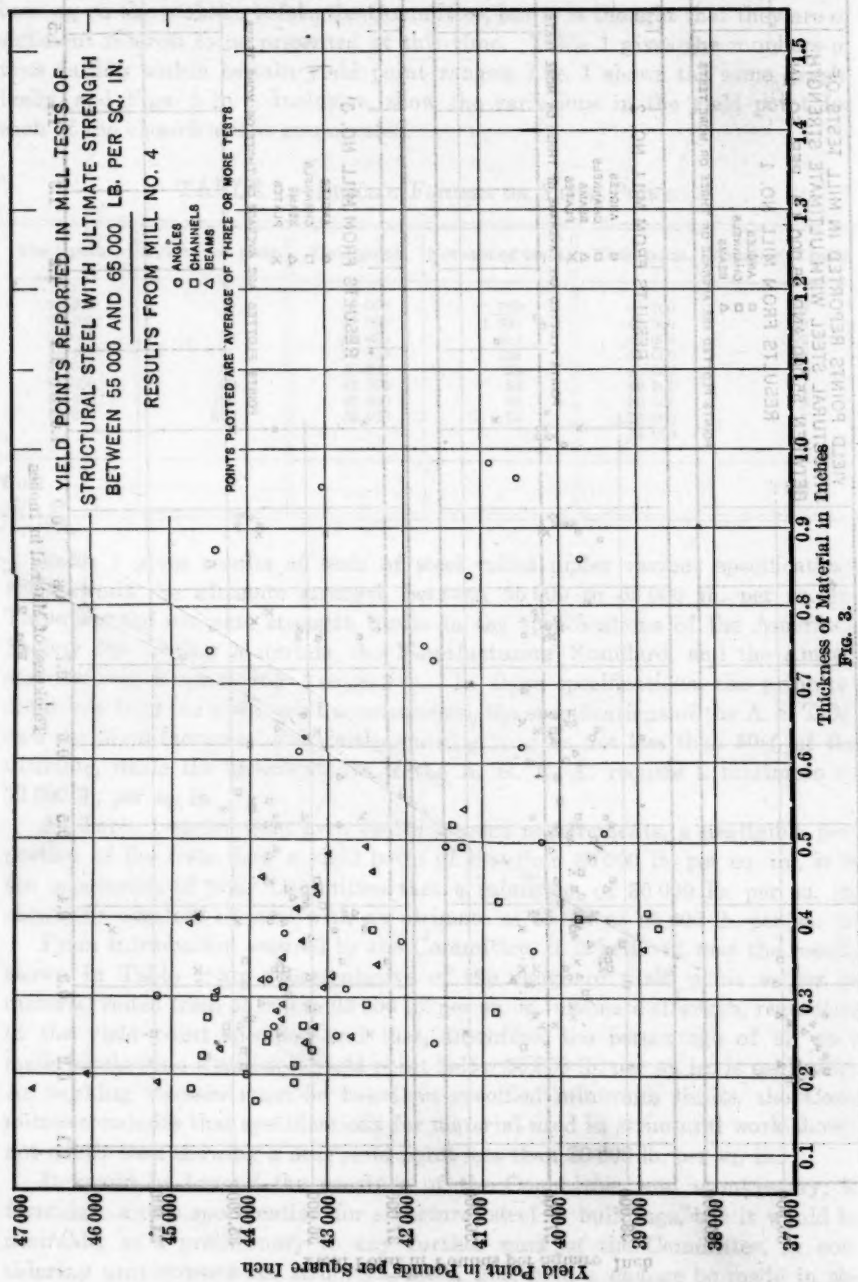
Table 1 gives results of tests of steel rolled under various specifications which limit the ultimate strength between 55 000 to 65 000 lb. per sq. in. These are the ultimate strength limits in the specifications of the American Society for Testing Materials, the Manufacturers' Standard, and the American Railway Engineering Association. In these specifications, the principal difference is in the yield point requirements, the specifications of the A. S. T. M. and the Manufacturers' Standard requiring it to be not less than 50% of the ultimate, while the specifications of the A. R. E. A. require a minimum of 30 000 lb. per sq. in.

As Table 1 shows that, even under present requirements, a negligible proportion of the tests show a yield point of less than 30 000 lb. per sq. in., it is the conclusion of your Committee that a minimum of 30 000 lb. per sq. in. should be required of steel with an ultimate of 55 000 to 60 000 lb. per sq. in.

From information secured by the Committee, it is believed that the results shown in Table 1 are representative of the range of yield point values in material rolled from 55 000 to 65 000 lb. per sq. in. ultimate strength, regardless of the yield point specified and that, therefore, the percentage of all such material showing a mill test yield point below 30 000 lb. per sq. in. is negligible. As working stresses must be based on specified minimum limits, the Committee concludes that specifications for material used in structural work should not admit steel showing a mill yield point less than 30 000 lb. per sq. in.

It would be beyond the province of the Committee, and unnecessary, to formulate a new specification for structural steel in buildings, but it would be desirable, as a preliminary to any further work of the Committee, in considering unit stresses for structural steel, that such a change be made in the yield point requirement of the specifications commonly used for structural material.







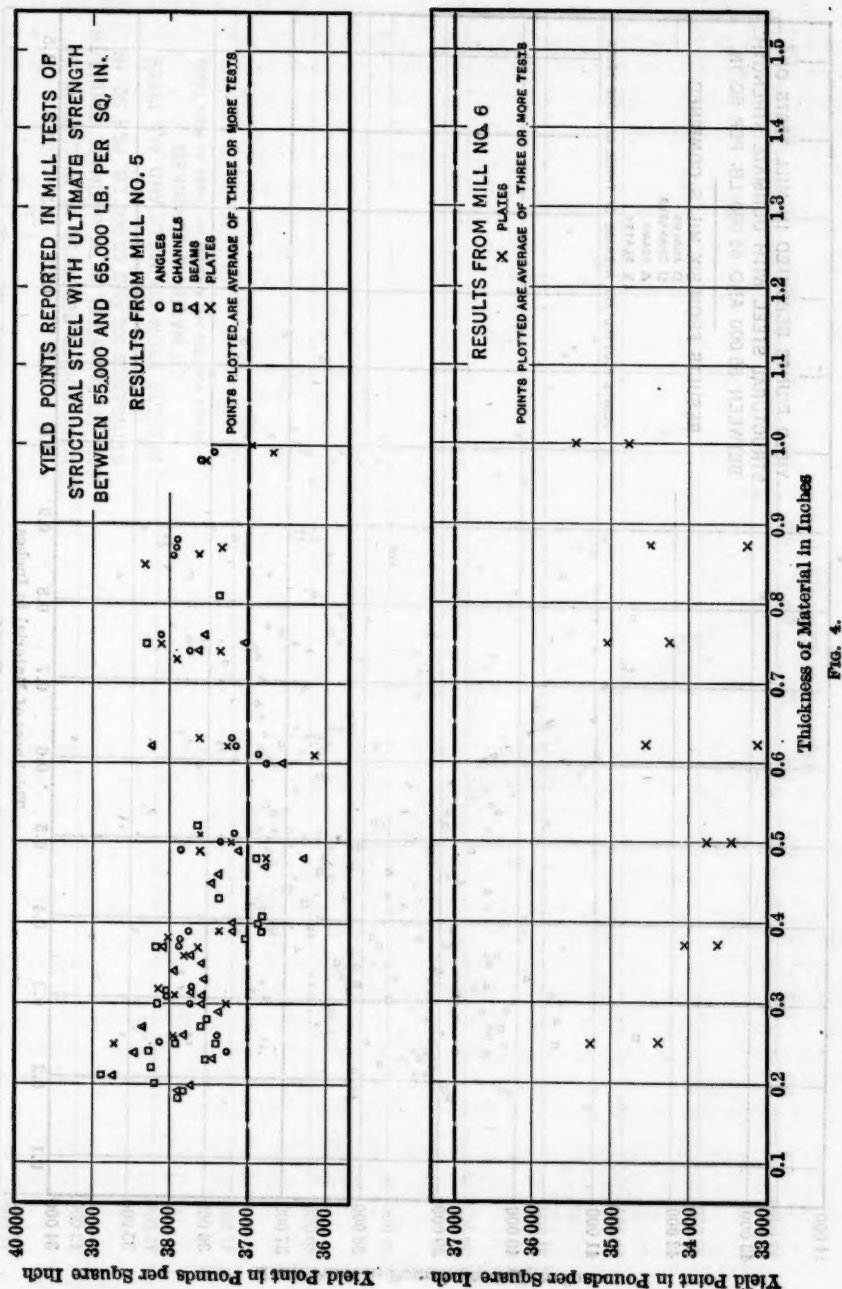
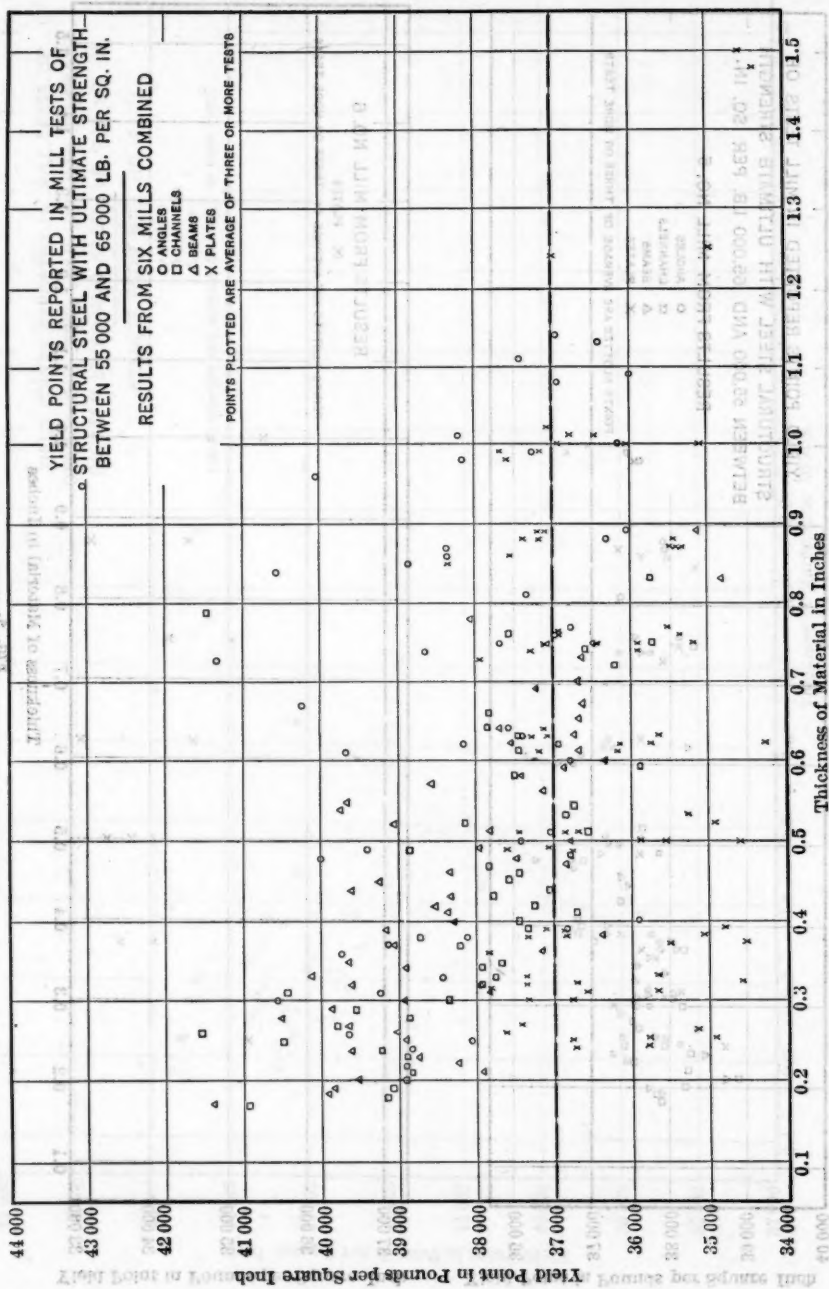


FIG. 4.



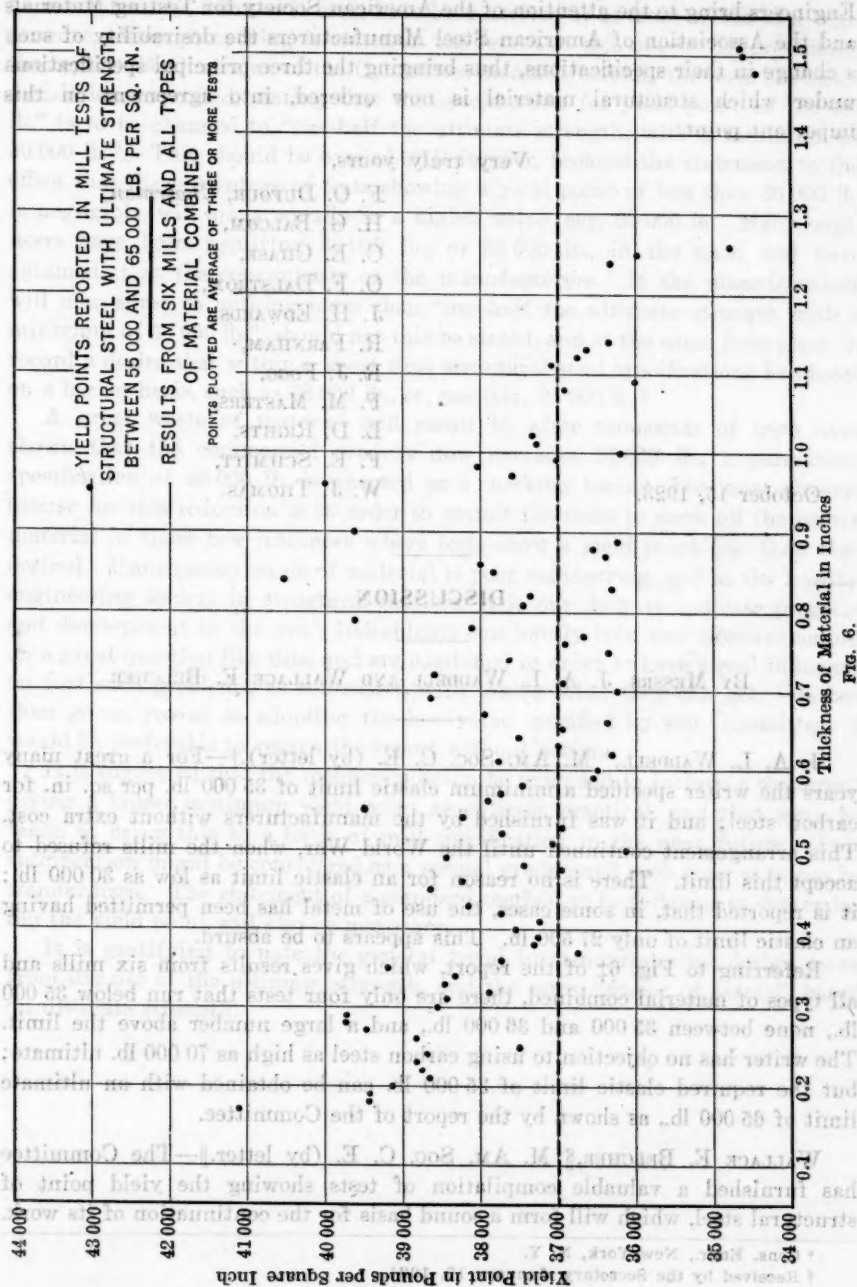


Fig. 6.

The Committee, therefore, recommends that the American Society of Civil Engineers bring to the attention of the American Society for Testing Materials and the Association of American Steel Manufacturers the desirability of such a change in their specifications, thus bringing the three principal specifications under which structural material is now ordered, into agreement on this important point.

Very truly yours,

F. O. DUFOUR, *Chairman*,  
H. G. BALCOM,  
C. E. CHASE,  
O. F. DALSTROM,  
J. H. EDWARDS,  
R. FARNHAM,  
R. J. FOGG,  
F. M. MASTERS,  
L. D. RIGHTS,  
F. E. SCHMITT,  
W. J. THOMAS.

October 15, 1923.

## DISCUSSION

BY MESSRS. J. A. L. WADDELL AND WALLACE E. BELCHER

J. A. L. WADDELL,\* M. Am. Soc. C. E. (by letter).†—For a great many years the writer specified a minimum elastic limit of 35 000 lb. per sq. in. for carbon steel; and it was furnished by the manufacturers without extra cost. This arrangement continued until the World War, when the mills refused to accept this limit. There is no reason for an elastic limit as low as 30 000 lb.; it is reported that, in some cases, the use of metal has been permitted having an elastic limit of only 27 500 lb. This appears to be absurd.

Referring to Fig. 6‡ of the report, which gives results from six mills and all types of material combined, there are only four tests that run below 35 000 lb., none between 35 000 and 36 000 lb., and a large number above the limit. The writer has no objection to using carbon steel as high as 70 000 lb. ultimate; but the required elastic limit of 35 000 lb. can be obtained with an ultimate limit of 65 000 lb., as shown by the report of the Committee.

WALLACE E. BELCHER,§ M. Am. Soc. C. E. (by letter).||—The Committee has furnished a valuable compilation of tests showing the yield point of structural steel, which will form a sound basis for the continuation of its work.

\* Cons. Engr., New York, N. Y.

† Received by the Secretary, January 19, 1924.

‡ See p. 269.

§ Structural Engr., Dwight P. Robinson & Co., New York, N. Y.

|| Received by the Secretary, January 19, 1924.



It seems, however, that the recommendation of the Committee bears too great an air of finality, whereas it must have been arrived at as more or less of a compromise, although nothing is stated in the report to this effect. In presenting the report, the Chairman of the Committee modified verbally the form of recommendation requested, stating that the specification for yield point of "30 000 lb." is to be changed to "one-half the ultimate strength, with a minimum of 30 000 lb.". This should be carried still further, because the statement to the effect that the percentage of tests showing a yield point of less than 30 000 lb. is negligible, will apply equally to a higher value, say, 33 000 lb. Many engineers have been requiring 33 000 lb., or 35 000 lb., in the past, and have obtained it at the convenience of the manufacturers. If the manufacturers will now agree to nothing more than "one-half the ultimate strength with a minimum of 30 000 lb.", should not this be stated, and at the same time place on record a desire that within a short time structural steel specifications be placed on a higher basis, such as 33 000 lb., or, possibly, 35 000 lb.?

A great waste of material will result if, after thousands of tests have shown that the commercial product now averages 37 000 lb., a permanent specification of 30 000 lb. is adopted as a working basis. The most obvious excuse for this reduction is in order to permit the mills to work off the poorer material in those few instances where tests show a yield point less than that desired. Unnecessary waste of material is poor engineering, and as the leading engineering society in structural matters, it is our duty to indicate progress and development in the art. Individuals can hardly take any effective action on a great question like this, and are combined in order to have a real influence on just such problems, as contrasted with taking what they can get. Rather than go on record as adopting the low value specified by the Committee, it would be preferable to return the report without action.

It is suggested that the recommendation be amended to include a statement giving a larger minimum yield point as entirely practical, and that steps be taken to bring this to a basis of mill specification in the near future. This specification might be considered as a special grade until such time as it can be standardized. The statement of a standard method to be followed in determining the yield point will also be necessary.

It is gratifying to note the general trend in structural steel design away from the use of the ultimate strength, and the term, "factor of safety", based on ultimate strength.

## Report of the Special Committee Appointed to Consider the Report Made to the National Fire Protection Association on the Fire Hazard of Docks, Piers, and Wharves\*

TO THE BOARD OF DIRECTION,  
AMERICAN SOCIETY OF CIVIL ENGINEERS:

GENTLEMEN.—Your Committee appointed “to consider the report made to the National Fire Protection Association, November 7, 1921, on the fire hazard of docks, piers, and wharves, and in co-operation with the committees of other Associations to analyze the regulations,” requested the Secretary to furnish information defining the limits of its activities, and was furnished the following excerpt from the report† of the Committee on Committees to the Board of Direction, at its meeting of January 16, 1922:

“Committee on Fire Protection. A

“This Society could not have a Standing Committee on Fire Protection unless it were a member of the National Fire Protection Association, because such a subject is not within the scope of the objects of this Society.

“The Society has been requested to suggest the appointment of a Special Committee to consider the report made to the National Fire Protection Association, November 7, 1921, on the fire hazard of docks, piers, and wharves, and in co-operation with the committees of other Associations to analyze the regulations proposed in the report with the object of their general adoption and future extension.

“Your Committee would recommend that such a Special Committee of Seven be appointed by the President, with the restriction that final report must be made within a year.

“Respectfully submitted,

“A. P. DAVIS,

“GEORGE H. PEGRAM,

“ANSON MARSTON,

“Committee on Committees.”

In view of this excerpt, the Committee respectfully suggests to the Board of Direction that the American Society of Civil Engineers should have a Standing Committee on Building Construction, the field of activity of which should cover all structures assimilated in character and use to buildings as ordinarily understood, including all those features of the buildings themselves intended to lessen the frequency of fires and to increase the resistance of the structures to fires; and that such Committee should co-operate with committees of other organizations on the same subject.

Your Committee was furnished with a reprint of the Report of the Committee on Docks, Piers, and Wharves, of the National Fire Protection Association, tentatively adopted June, 1921, and what follows refers to that pamphlet.

It is the opinion of your Committee that the Committee of the National Fire Protection Association on Docks, Piers, and Wharves, is deserving of

\* Presented to the Annual Meeting, January 16, 1924.

† *Proceedings*, Am. Soc. C. E., March 1922, p. 225.

much credit for its commendable efforts to formulate Rules and Regulations for the design of docks, piers and wharves, such that the fire hazard will be reduced. Your Committee suggests, however, that the "Introduction", "Fire Record", Section I, and Section II, of the report, are not Regulations, but explanatory of the necessity for them, and, as such, should be re-written to include what is said in this report relative to Section V, concerning concrete, and be printed in a separate pamphlet for use in educational purposes (or as a Preface to the Regulations, if thought best), your Committee assuming that when the Regulations are finally adopted by the National Fire Protection Association, with the approval of committees of other Associations, they will then be in shape to be incorporated in the building construction ordinances of cities and towns, and, at the same time, serve as a basis for classification of risks and schedules of rates by insurance companies.

After consideration of Section III, your Committee recommends that this Section, to be designated as Section I, be changed to read as follows, the last term and definition as given in the report being omitted:

#### SECTION I.—NOMENCLATURE.

**Wharf or Quay.**—A Wharf or Quay is a structure having a platform, built along the shore line of a navigable water, at which vessels may be berthed for discharging or taking on freight and passengers, or for temporary anchorage.

**Pier.**—A Pier is a structure usually of greater length than width, extending from the Pier Head Line, or some point within the same, of a navigable water, to the mainland, on each side and at the end of which, vessels may be berthed for discharging or taking on freight or passengers, or both, and for temporary anchorage.

**Dock.**—A Dock is a basin in which vessels may remain afloat when berthed at a wharf or pier, or tied up at a mooring post. This definition, strictly speaking, covers only a Wet Dock.

**Slip.**—A Slip is an extension, artificial or otherwise, of a navigable water into the space between adjacent structures, within which vessels may be berthed or moored.

**Bulkhead Wall.**—A Bulkhead Wall is a structure which separates solid earth or fill from the water area of a stream or harbor, or the parts thereof.

**Bulkhead Line.**—A Bulkhead Line is a line established by Government authority, beyond which bulkhead walls may not be constructed.

**Pierhead Line.**—A Pierhead Line is a line established by Government authority, beyond which structures of any and every kind may not extend into a navigable stream or water.

**Pile and Deck Type of Pier.**—A Pile and Deck Type of Pier is one having a single platform supported on piles of any kind.

**Pile Platform and Deck Type of Pier.**—A Pile Platform and Deck Type of Pier consists of a substructure of piles carrying a platform at low water, and a pier deck supported on columns or bearing walls resting on the low-water platform.

**Block and Bridge Type of Pier.**—A Block and Bridge Type of Pier has a substructure of cribwork, or blocks of stone or concrete supporting the pier deck.

**Solid Fill Type of Pier.**—A Solid Fill Type of Pier has a bulkhead wall forming the sides and outer end of a filled-in area constituting the support of the main floor of the structure, or which may be so used.

**Fire Bulkhead.**—A Fire Bulkhead is a construction on the outside of a pier and made a part thereof, to prevent oil and floating fires from passing thereunder.

**Mooring Post.**—A Mooring Post is a pile or a cluster of piles, sometimes called a dolphin, to which vessels may be tied up in lieu of being anchored.

**Pier Deck.**—A Pier Deck is the lowest platform of a pier used for traffic purposes.

**Substructure.**—A Substructure is that which supports the pier deck and its superimposed load.

**Superstructure.**—A Superstructure is that portion of any pier, above the pier deck.

**Fire Resistive.**—This term indicates materials and construction which will satisfactorily resist fire, in accordance with the specifications established by The Joint Conference on Fire Tests.

Your Committee is of the opinion that the next Section as printed should be effaced, and recommends that it read as follows:

## SECTION II.—FIRE-WALLS AND CLEAR HEIGHT.

**Fire-Walls.**—Piers shall be provided at intervals not exceeding 400 ft. with cross-wise fire-walls extending from low water, or from the top of the solid fill where such exists, to 3 ft. above the roof. There shall be no more openings through these cross-wise fire-walls than are necessary for the economical handling of traffic. All such openings shall be equipped with fire doors having at least a 1-hour rating. All fire-walls shall extend laterally through the sides of the superstructure. On the pile and deck type of pier, the fire-wall shall extend to the under side of the deck.

**Clear Height.**—The Clear Height from the pier deck to the lowest point of an overhead truss shall not exceed 22 ft. for a one-story superstructure, or in the second story of a two-story superstructure. For the lower story of a two-story superstructure, the clear ceiling height shall not exceed 24 ft. unless greater heights are required by law or ordinance.

Your Committee recommends that what is printed under Section V of the report of the Committee of the National Fire Protection Association, be omitted, and that, in lieu thereof, the following be included in the pamphlet accompanying the Regulations, or in the Preface:

**Concrete.**—In the Regulations, concrete is recognized as a fire-resistive material, suitable for use in marine structures. Concrete work for such purposes should be intrusted to persons of recognized experience and ability; otherwise, the chemical action of sea water may reduce the life of the structure below economical limits.

From investigations now under way, it is reasonable to hope that the use of concrete in sea water may be soon established upon a basis where ordinary skill and care will be sufficient. In the meantime, satisfactory results can be ensured only by employing engineers and contractors especially skilled in this work.

## SECTION III.—FIRE-RESISTIVE PIERS OR WHARVES.

Your Committee recommends that in lieu of what is printed under Paragraphs 1, (a), (b), (c), and (d), of Section III of the report, the following be substituted:

"All that portion of the structure of fire-resistive piers and wharves above low water shall be of stone, concrete, steel protected by concrete, or any form



of construction that meets the standard fire test for a four-hour rating as approved by the American Engineering Standards Committee."

Your Committee recommends that Paragraphs 2, 4, 6 (b), 6 (d), 6 (g), and 6 (j), be approved as printed. It recommends that Paragraph 3, and Sub-Paragraphs 6 (h) and 6 (i) be omitted. It recommends that Paragraph 5 be approved, except the note which it thinks should be omitted. Paragraph 6 (a), your Committee approves as written, with the word, "approximately", added to the last sentence before the figures, "200." Sub-Paragraph 6 (c), it recommends to be changed by omitting the first sentence, and that the word, "fire", precede the word, "walls", in the second sentence. It also recommends that the third sentence be omitted. Sub-Paragraph 6 (e), your Committee recommends should read as follows:

**"Roof.**—Shall be of reinforced concrete at least 2½ in. thick, or the equivalent. Roof trusses shall be of reinforced concrete or steel; when steel is used, both sides of the truss and the bottom of the lower chord shall be encased with metal lath substantially supported, and 1 in. of cement plaster or the equivalent thereof."

Your Committee recommends that Sub-Paragraph 6 (f) be changed to read:

**"Skylights.**—At least one 5 by 20-ft. standard thin glass automatic skylight shall be placed in every bay between trusses, and above and below the skylight there shall be standard metal screens."

This Section would then read as follows:

### SECTION III.—FIRE-RESISTIVE PIERS OR WHARVES.

1.—**Substructures or Piling.**—All that portion of the structure of fire-resistive piers and wharves above low water shall be of stone, concrete, steel protected with concrete, or any form of construction that meets the standard fire test for a four-hour rating as approved by the American Engineering Standards Committee.

2.—**Fire Bulkhead.**—Unless prohibited by local or Federal requirements, where the structure does not include retaining walls as in the solid-fill type, or, as may be in the block and bridge, and pile and platform types, a fire bulkhead shall be constructed on all sides extending from low water to high water. It should preferably be of reinforced concrete not less than 6 in. thick, but may be constructed by securely fastening to the outer row of piles a tight sheathing of 6 by 10-in. planks.

3.—**Fender System.**—A complete fender system shall be provided on all sides and ends. It shall be constructed so as to provide thorough protection to the concrete from the erosive action of floating ice and debris, water currents and swells, and from the abrasion of vessels. It may be constructed so as to provide the flexibility desired in some locations.

4.—**Scuppers.**—The pier deck and floors shall be equipped with scuppers designed and installed in accordance with the Regulations governing the Installation of Scuppers, contained in the Regulations of the National Board of Fire Underwriters governing Standard Mill Construction.

5.—**Pier Shed.**—

(a).—**Side Walls.**—Side-walls shall be of reinforced concrete not less than 8 in. thick, or the equivalent, except where it is necessary to have the entire side or a part thereof composed of cargo

doors. The doors shall have fire-resistive qualities equal to a standard fire door for fire-walls, and capable of being closed by one man. At intervals of 200 ft., there shall be a dwarf or smash door for the use of watchmen, firemen, and workmen.

(b).—End Walls.—End walls shall be of concrete, reinforced, at least 4 in. thick, or the equivalent.

(c).—Fire-Walls.—Fire-walls shall be of reinforced concrete, or the equivalent, 12 in. thick, for walls 22 ft. or less in height, and less than 80 ft. long; walls over 22 ft. high and over 80 ft. long shall be at least 16 in. thick for the lower 22 ft., and 12 in. thick above. Openings in fire-walls shall be as small as the requirements of the business will permit. When there are openings above railroad tracks, a standard sill for door openings shall be provided flush with the top of the rails.

(d).—Columns and Girders.—Where steel columns and girders are used, they shall be protected by 3 in. of concrete, or the equivalent.

(e).—Roof.—Roofs shall be of reinforced concrete at least 2½ in. thick, or the equivalent. Roof trusses shall be of reinforced concrete or steel; when steel is used, both sides of the truss and the bottom of the lower chord shall be encased with metal lath substantially supported and 1 in. of cement plaster, or the equivalent thereof.

(f).—Skylights.—At least one 5 by 20-ft. standard thin glass automatic skylight shall be placed in every bay between trusses, and above and below the skylight there shall be standard metal screens.

(g).—Stairs, Elevators, Escalators and Chutes.—Stairs, elevators, escalators and chutes shall be protected by fire-resistive enclosures of reinforced concrete at least 4 in. thick, or the equivalent; door openings to be protected by standard fire-doors. When such enclosures form a shaft extending from the pier deck to the roof, they shall be provided with standard thin glass skylights.

(h).—Offices, Rest, Auction, Rigging, Boiler, and Other Rooms with Hazardous Occupancy, and Carpenter Shop.—These rooms, where possible, should be located in buildings detached from the pier. When located on the pier, they shall be enclosed in walls of reinforced concrete not less than 4 in. thick, or the equivalent. Door openings shall be protected by standard fire-doors, and all windows to these rooms, except offices and rest rooms, shall be in the exterior walls. Windows of offices and rest rooms in the interior walls shall be of standard wire glass in metal frames. Door openings to rest rooms shall be from the outside.

The stack from the boilers, if on the pier, and if of metal, shall have standard ventilating protection at roof, or if passing through one or more stories above, shall be encased in masonry not less than 8 in. thick to a point 12 in. above the roof, with an air space of at least 4 in. between stack and masonry, so ventilated as to secure a free and continuous current of air.

Oil and lamp rooms shall be entirely of approved fire-resistive construction, with walls of reinforced concrete not less than 4 in. thick or equivalent, sills of doors shall be raised at least 4 in. from floor, and the opening shall be protected by standard fire door on inside of wall. They shall be detached from the pier where possible, or if on the pier, located at the end where practicable. Windows or vent openings shall be provided, having an area equal to at least 5% of the floor area of the room, shall be of thin glass, and, if possible, in the ceiling. If in the outer wall, they must not be placed below a cargo door, but

may open overhead into a vertical concrete shaft with walls at least 4 in. thick extending 3 ft. above the roof. Any ventilating openings, wherever located, shall be arranged so as to close promptly and completely in event of fire, by means of an approved heat-actuated device.

#### SECTION VII.—NON-FIRE-RESISTIVE PIERS AND WHARVES.

Your Committee does not see the necessity of Paragraphs 1 and 2 of Section VII of the report, in view of what has preceded, which is considered applicable to all piers.

It recommends the approval of Paragraphs 3 and 4, and of Paragraph 5, except the note.

It recommends that Paragraph 6 be omitted.

It approves of the first four sentences of Paragraph 7, and recommends that the remainder of the paragraph read as follows:

"When steel trusses are used, both sides and the bottom of the trusses shall be protected with metal lath substantially supported, and 1 in. of cement plaster or the equivalent. When wooden trusses are used, one side of each truss shall be solidly covered with 2-in. tongued and grooved plank."

It approves of Paragraphs 8 and 9 as printed.

It recommends that the first sentence of Paragraph 10 be changed so as to read:

"At intervals of approximately 400 ft., there shall be a fire-wall extending from low tide to a point at least 3 ft. above the roof, and extending through the side walls at each end."

It recommends the approval of the remainder of this paragraph.

It recommends that Paragraph 11 be changed so as to read:

"At least one 5 by 20-ft. standard automatic skylight shall be constructed in every bay midway between the fire curtains, and above and below the skylights there shall be standard metal screens."

It recommends the approval of Paragraph 12 as printed.

It considers Paragraph 13 to be impracticable, and recommends that it be eliminated.

It recommends that the word, "approximately", be inserted in the second line of Paragraph 14, before the figure, "20", and that the paragraph as printed and so changed be then approved.

It recommends the approval of Paragraph 15 as printed.

This Section would then read as follows:

#### SECTION IV.—NON-FIRE-RESISTIVE PIERS AND WHARVES.

1.—*Pier Deck.*—The pier deck shall consist of sawed timber not less than 8 by 12 in. in cross-section, for the pile capping and rangers. On the rangers shall be laid a deck of 4-in. plank, and, on this, a 3-in. sheathing or wearing surface of plank. The sheathing and deck planks shall be laid at right angles, except that in the driveways the sheathing may be laid diagonally. The use of joists as a substitute for the rangers is not approved for this type of construction. When railroad tracks are placed on the pier deck and are depressed, the sides and bottom of the depression shall be constructed the same as the pier deck.

2.—*Floors Above Pier Deck.*—Floors of any stories above the pier deck shall be not less than 4-in. splined or tongued and grooved plank covered with 1-in. flooring laid cross-wise or diagonally. Water-proofing material shall be laid between the planking and the flooring, in such a manner as to make a thoroughly water-proof flooring.

3.—*Scuppers.*—The pier deck and floors shall be equipped with scuppers designed and installed in accordance with the regulations governing the installation of scuppers contained in the Regulations of the National Board of Fire Underwriters governing Standard Mill Construction.

4.—*Roof.*—Roofs shall be of plank and timber construction. Planks shall not be less than 2½ in. splined, or tongued and grooved. Timber shall be not less than 6 in. in either dimension, and shall be single-stick. Roof coverings shall be the equivalent of the Class "A" or "B" specifications of the National Board of Fire Underwriters. When steel roof trusses are used, both sides and the bottom of each truss shall be protected with metal lath substantially supported, and 1 in. of cement plaster, or the equivalent. When wooden trusses are used, one side of each truss shall be solidly covered with 2-in. tongued and grooved plank.

5.—*Columns, Girders, and Floor Timbers.*—

(a).—Columns, if of timber, shall be suitable for the load carried, but shall not be less than 8 in. in the smallest cross-sectional dimension; wooden columns shall be superimposed through all stories on concrete caps.

If steel columns are used, they shall be protected by metal lath and 1 in. of cement plaster, or the equivalent, and where the protection is exposed to mechanical injury, it shall be protected by suitable guards of iron, steel, or wood slats.

(b).—Wood girders for floor timbers shall be single-stick, suitable for the load carried, but in no case less than 6 in. in either dimension. If steel girders or beams are used, they shall be protected the same as steel columns.

6.—*Side or End Walls.*—Side or end walls may be of wood, in which case not less than 2-in. plank nailed to studding not less than 3 in. in its smallest dimension, shall be used. Where it is necessary to have the entire sides, or a part thereof, composed of cargo doors, the doors must be of construction equivalent to side-walls. Corrugated iron or sheet iron on wooden or steel framing is not approved.

7.—*Fire Walls.*—At intervals of approximately 400 ft., there shall be a fire wall extending from low tide to a point at least 3 ft. above the roof, and extending through the side-walls at each end. Such walls shall be constructed of at least 6 in. of reinforced concrete, or its equivalent. Every opening shall be protected on each side by fire doors constructed and installed so as to have fire-resisting qualities equal to standard fire doors for fire walls. When these openings are above railroad tracks, a standard sill for door openings shall be provided flush with the top of the rails.

When piers are located in soft or yielding bottoms, where unequal loading results in unequal settlement, the substructure for the division walls shall be separate and distinct from the substructure of the pier.

8.—*Skylights.*—At least one 5 by 20-ft. standard thin glass automatic skylight shall be constructed in every bay, midway between the fire curtains; above and below the skylights, there shall be standard metal screens.

9.—*Stairs, Escalators, Elevators, and Chutes.*—Stairs, escalators, elevators and chutes shall be enclosed in fire-resistive enclosures of reinforced concrete at least 3 in. thick, or the equivalent; door openings shall be protected by standard fire doors. When such enclosures form a shaft extending from the pier deck to the roof, they shall be provided with standard thin glass skylights.



When piers are located in soft or yielding bottoms, where unequal loading results in unequal settlement, the substructure for these walls shall be separate and distinct from the substructure of the pier.

10.—*Openings for Revolving Nozzles, Cellar Pipes, etc.*—There shall be provided at approximately 20-ft. intervals, longitudinally and transversely, openings in the pier deck to enable the fire department to place in operation with the least possible delay, cellar pipes, revolving nozzles, and other devices used in extinguishing cellar fires. These openings should be at least 10 in. in diameter, and provided with cast-iron covers that can be removed easily.

11.—*Offices, Rest, Auction, Rigging, Boiler, and Other Rooms with Hazardous Occupancy, and Carpenter Shop.*—These rooms, where possible, should be located in buildings detached from the pier. When located on the pier, they shall be enclosed in walls of reinforced concrete, not less than 4 in. thick, or the equivalent. Door openings shall be protected by standard fire doors, and all windows to these rooms, except in offices and rest rooms, shall be in exterior walls. Windows of offices and rest rooms in the interior walls shall be of standard wire glass in metal frames. Door openings to rest rooms are to be from the outside.

The stack from the boilers, if on the pier, and if of metal, shall have standard ventilating protection at the roof, or if passing through one or more stories above, shall be encased in masonry not less than 8 in. thick to a point 12 in. above the roof, with an air space of at least 4 in. between stack and masonry, so ventilated as to secure a free and continuous current of air.

Oil and lamp rooms shall be entirely of approved fire-resistive construction, with walls of reinforced concrete not less than 4 in. thick, or the equivalent, the sill of doors to be raised at least 4 in. from the floor, openings to be protected by standard fire doors on inside of wall. They shall be detached from pier where possible, or if on pier, located at the land end where practicable. Windows or vent openings shall be provided having an area equal to at least 5% of the floor area of the room; they shall be of thin glass, and, if possible, in the ceiling. If in the outer wall, they must not be placed below a cargo door, but may open overhead into a vertical concrete shaft with a wall at least 4 in. thick extending 3 ft. above the roof.

Any ventilating openings, wherever located, shall be arranged so as to close promptly and completely in event of fire, by means of an approved heat-actuated device.

#### SECTION VIII.—TREATMENT OF EXISTING PIERS.

Your Committee sees no reason why the coating of oil that may be deposited on piles should be scraped off prior to covering them with metal lath and cement plaster, as stated in Paragraph 1.

Your Committee is of the opinion that the question of dry rot under the cement plaster coating should be investigated, its information being that, in at least some instances, the life of a pile so protected is reduced substantially 50 per cent.

Your Committee approves of Paragraphs 2 and 3, as printed.

Your Committee recommends that Paragraph 4 read as follows:

"When roof trusses are of steel, both sides and the bottom of each truss shall be protected with metal lath substantially supported, and 1 in. of cement plaster, or the equivalent thereof. When wooden trusses are used, one side of each truss shall be solidly covered with 2-in. tongued and grooved plank."

Your Committee recommends that the first sentence of Paragraph 5 be changed to read as follows:

"At intervals of approximately 400 ft., there shall be a fire wall extending from low-tide level to a point 3 ft. above the roof, and extending through the side walls at each end."

The remainder of the paragraph is approved as printed.

Your Committee recommends that Paragraph 6 be changed to read as follows:

"At least one 5 by 20-ft. standard thin glass automatic skylight shall be constructed midway between the fire curtains, with standard metal screens above and below it."

Paragraph 7 is approved as printed.

Your Committee considers Paragraph 8 impracticable, and recommends its elimination.

It recommends that the word, "approximately", be inserted before the figure "20", in the second line of Paragraph 9, and it then be approved as printed.

Paragraph 10 is approved as printed.

This Section would then read as follows:

#### SECTION V.—TREATMENT OF EXISTING PIERS.

1.—*Piling*.—Piling shall be covered with metal lath and cement plaster at least 4 in. thick, for the length of the piles between low water and high water.

2.—*Fire Bulkhead*.—Where the substructure does not have retaining walls, a fire bulkhead shall be constructed on both sides and the end thereof, extending from low water to high water. It shall be constructed by securely fastening to the outer row of piles a tight sheathing of 6 by 10-in. planks, or reinforced concrete 6 in. thick. In no case shall this bulkhead be carried to the pier deck so as to interfere with the free circulation of air under the pier.

3.—*Steel Columns, Girders, or Beams*.—Steel columns, girders, and beams shall be protected by metal lath and cement plaster at least 1 in. thick, or the equivalent. If the protection is exposed to injury, it shall be protected by suitable guards of iron, steel, or wood.

4.—*Roof Trusses*.—Where roof trusses are of steel, both sides and the bottom of each truss shall be protected with metal lath substantially supported, and 1 in. of cement plaster, or the equivalent. When wooden trusses are used, one side of each truss shall be solidly covered with 2-in. tongued and grooved plank.

5.—*Fire Walls*.—At intervals of approximately 400 ft., there shall be a fire wall extending from low-tide level to a point 3 ft. above the roof, and extending through the side walls at each end.

Such fire walls may be constructed in either one of the following ways. Their superiority as fire-breaks is in the order in which they are given. Cargo doors in side walls shall not be installed so as to slide past fire walls:

(a).—They may be constructed of at least 6 in. of reinforced concrete, or its equivalent. Every opening in a fire wall shall be protected on each side by fire doors constructed and installed so as to have fire-resisting qualities equal to those of standard fire doors for fire walls. When these openings are above railroad tracks, a standard sill for door openings shall be provided flush with the top of the rails. Unless it is certain that the existing piling will sustain in a satisfactory manner the additional load due to the division wall, independent piling shall be provided to carry this wall.

(b).—They may be of two thicknesses of 2-in., well-seasoned, tongued and grooved boards, with  $\frac{1}{4}$ -in. asbestos boards between them. Parti-

tions shall be nailed together with wrought-iron nails, clinched. It is recommended that fireproofed wood be used for these partitions. When ordinary lumber is used, it shall be coated thoroughly, at least once each year, with navy whitewash or fireproof paint. All door openings shall be protected by doors having fire-resistive qualities equal to those of the partition.

(c).—They may be of 2 by 6-in. plank, laid flat and spiked together. Tight dove-tail joints shall be used at the ends of planks. Walls shall be coated thoroughly, at least once each year, with navy whitewash or fireproof paint. All door openings shall be protected by doors having fire-resistive qualities equal to those of the partitions.

6.—*Skylights.*—At least one 5 by 20-ft. standard thin glass automatic skylight shall be constructed midway between the fire curtains, with standard metal screens above and below it.

7.—*Stairs, Elevators, Escalators, and Chutes.*—Stairs, elevators, escalators, and chutes, shall be enclosed in fire-resistive enclosures of reinforced concrete at least 2 in. thick, or the equivalent, or may be of 2 in. of solid metal lath and cement plaster, or of 2 by 4-in. wood studding, with metal lath on each side, covered with 1 in. of cement plaster. Door openings shall be protected by standard fire doors. When such enclosures form a shaft extending from the pier deck to the roof, they shall be provided with standard thin glass skylights.

8.—*Openings for Revolving Nozzles, Cellar Pipes, etc.*—There shall be provided at approximately 20-ft. intervals, longitudinally and transversely, openings in the pier deck to enable the fire department to place in operation with the least possible delay, cellar pipes, revolving nozzles, and other devices used in extinguishing cellar fires. These should be at least 10 in. in diameter, and be provided with cast-iron covers that can be removed easily.

10.—*Offices, Rest, Auction, Rigging, Boiler and Other Rooms with Hazardous Occupancy, and Carpenter Shop.*—These rooms, where possible, should be located in buildings detached from the pier. When located on the pier, they shall be enclosed in walls of reinforced concrete not less than 4 in. thick, or the equivalent. Door openings shall be protected by standard fire doors, and all windows to these rooms, except offices and rest rooms, shall be in the exterior walls. Windows of offices and rest rooms in the interior walls shall be of standard wire glass in metal frames. Door openings to rest rooms shall be from the outside.

The stack from the boilers if on the pier, and if of metal, shall have standard ventilating protection at the roof, or if passing through one or more stories, above, shall be encased in masonry not less than 8 in. thick, to a point 12 in. above the roof, with an air space of at least 4 in. between stack and masonry, so ventilated as to secure a free and continuous current of air.

Oil and lamp rooms shall be entirely of fire-resistive construction, with walls of reinforced concrete not less than 4 in. thick, or equivalent, sills of doors to be raised at least 4 in. from the floor, openings to be protected by standard fire doors on inside of wall. They shall be detached from the pier where possible, or if on the pier, located at the land end wherever practicable. Windows or vent openings shall be provided having an area equal to at least 5% of the floor area of the room. They shall be of thin glass, and, if possible, in the ceiling. If in outer walls, they must not be placed below a cargo door, but may open overhead into a vertical concrete shaft with walls at least 4 in. thick, extending 3 ft. above the roof.

Any ventilating openings, wherever located, shall be arranged so as to close promptly and completely, in event of fire, by means of an approved heat-actuated device.

## SECTION IX.

Your Committee recommends that the word "adjacent" be substituted for the word "various" in the last sentence in Paragraph 1, and that this paragraph as printed and so changed, be approved.

It recommends that Paragraph 2 as printed be approved.

It recommends that the second sentence of Paragraph 3 be changed so as to read: "Substantial guards shall be erected around all fire doors." With this change, it recommends that this paragraph as printed be approved.

This Section will then read as follows:

## SECTION VI.—MISCELLANEOUS.

1.—*Slips and Docks.*—Slips and docks should be of sufficient width to permit of free movement of vessels and auxiliary craft on each side of the slip, with enough space between to enable fireboats to manœuvre in the slip. They should be not less than 250 ft. wide, between adjacent piers, or wharves.

2.—*Stocks and Cargoes.*—Stocks and cargoes shall be kept at least 2 ft. from all side-walls and ceilings, and clear of all fire appliances.

3.—*Fire Doors.*—Fire doors shall be inspected weekly for physical and operating conditions, and obstructions by cargo. Substantial guards shall be erected around all fire doors. All doors in division walls shall be closed, except when in actual use. Where doors are over tracks, any train of cars placed on the tracks shall be broken at the door openings to permit of closing of the doors. If there is any danger of cars being backed into the closed doors, substantial portable bumpers shall be provided and set against all inward movement of cars.

## SECTION X.—FIRE PROTECTION.

Your Committee recommends that Paragraph 1 as printed be approved.

It recommends the approval of Paragraph 2 as printed.

It recommends at the beginning of the seventh sentence of Paragraph 3 the words, "where climatic conditions require it", before the words, "all piping, etc.", and that the entire paragraph as printed and so changed, be approved.

It recommends that the first word of Paragraph 4 be omitted, and that this paragraph as printed and so changed, be approved.

It recommends the approval of Paragraphs 5, 6, and 7.

It recommends that the word "approximately", be inserted before the number, "100", in the second line of Paragraph 8, and that the paragraph as printed and so changed be approved.

It recommends the approval of Paragraphs 9, 10, 11, and 12, as printed.

It recommends that the first sentence of Paragraph 13 be changed so as to read: "Approved watch service shall be provided on each pier, with watchmen on duty at all times." With this change, your Committee recommends the approval of this paragraph as printed.

This Section will then read as follows:

## SECTION VII.—FIRE PROTECTION.

1.—*Automatic Sprinklers.*—A complete approved system of automatic sprinklers shall be installed in accordance with the rules and regulations of the National Board of Fire Underwriters. When such sprinkler system is not



installed, the areas subject to one fire shall be reduced by closer spacing of fire walls.

**2.—Open Sprinklers.**—A complete system of open sprinklers shall be installed in accordance with the rules and regulations of the National Board of Fire Underwriters. These shall cover side and end walls, cargo doors, and every roof structure.

**3.—Standpipe System.**—An independent standpipe system shall be installed on each pier, and used for fire protection purposes only. Ships shall be watered from a separate ship supply line. For piers 500 ft. or less in length, the standpipe lines shall be not less than 6 in. in diameter; for piers over 500 ft. in length, an 8-in. line shall be used. When piers are over 60 ft. in width, a loop system is recommended. Hose stations shall be installed at intervals of not more than 100 ft. These may include, as required by the inspection department having jurisdiction, provision for first aid streams, and for powerful streams intended for use by organized fire brigades and public fire departments, as provided for in the Regulations of the National Board of Fire Underwriters for the Installation of Standpipe Systems. Where climatic conditions require it, all piping shall be enclosed in not less than 2 in. of mineral wool, or other suitable lagging, and protected further from freezing, by circulating hot water, or by the installation of a steam or hot-water line enclosed with the supply line. When the supply line is installed so as to make it necessary to reach hose outlets with short branches, hot water or steam heating shall be used, the hose branches being heated by a loop in the heating line. The prevention of freezing by opening drain connections is prohibited. Before lagging is applied, the system should be tested and proven tight at 200 lb. pressure.

All protection to the piping against freezing may be omitted when an approved dry-pipe system, and approved quick-operating valve system are installed.

The standpipe system may be supplied from any one of the following sources:

(a).—A municipal water system, capable of supplying at least four effective fire streams.

(b).—A standard Underwriters fire pump of at least 1000 gal. capacity. When the pump drafts salt water, the system shall be charged at all times with fresh water.

(c).—An elevated tank of not less than 60 000 gal. capacity, with bottom of tank at least 50 ft. above the roof; tank supply to be used for fire protection purposes only.

**4.—Roof Hydrants.**—Standard two-way roof hydrants shall be installed on the roofs, spaced not over 200 ft. apart. These shall be provided with standard hose houses constructed and equipped as provided for in the rules and regulations of the National Board of Fire Underwriters for Standard Hose Houses. Roof hydrants shall be supplied through not less than 4-in. gated connection from the standpipe lines.

**5.—Standpipe Heating System.**—Any independent or separate heating system for heating standpipe lines shall have the boiler located in a detached building. When this is impossible, the boiler may be located on the pier when at the shore end and in a fire-resistive enclosure. The floor in the heater room shall be of not less than 6 in. of concrete, or 8 in. of hollow tile.

**6.—Fire Department Connection.**—One or more Siamese fire department connections, properly checked and drained, shall be provided at shore and water ends. Where practicable, it is recommended that shore connection be by means of 4-way reverse hydrants, connected to the pier by underground pipes of adequate size, and located a safe distance from the pier. Where there are one, two, or more, adjacent piers under one management, reverse hydrants

shall be connected into, and pier connection taken from, a header, especially in the case of sprinklered piers, where a large water supply is desirable.

7.—*Monitor Nozzles.*—When required by the inspection department having jurisdiction, monitor nozzles shall be installed on the roof, at intervals not exceeding 200 ft., and located midway between roof hydrants. Installation shall be made in accordance with the rules contained in the Regulations of the National Board of Fire Underwriters for the Installation of Standpipe Systems.

8.—*Casks and Pails, and Bucket Tanks.*—On each side of a driveway, there shall be placed at approximately 100-ft. intervals, one 50-gal. cask for water and three pails. The casks are to be painted red, with "For Fire Only" stenciled in black letters, not less than 2½ in. high. Casks are to be provided with good substantial covers having strong handles. Where casks are liable to injury from trucking, they shall be mounted on platforms, and provided with substantial guards.

9.—*Pump Tanks.*—Approved 5-gal. pump tanks may be installed in place of one-half the cask and pail equipment that would be required, on the basis of one pump tank being equal to one cask and three pails, the pump tanks to be distributed so as to alternate with the casks and pails.

10.—*Chemical Extinguishers.*—Approved non-freezing chemical extinguishers may be installed to replace one-half the cask-and-pail equipment that would be required, on the basis of two 2½-gal. extinguishers being equal to one cask and three pails, the chemical extinguishers to be distributed so as to alternate with the casks and pails.

11.—*Chemical Engines.*—In addition to the hand protection provided for above, approved chemical engines may be installed on the basis of one engine for each 20 000 sq. ft. of floor area. Unless the engines are of the non-freezing type, each engine must be housed in an enclosure having double sides, top, bottom, and doors, with 4 in. of mineral wool, or other suitable insulation between the walls, and the tank of the engine shall be lagged with 2 in. of mineral wool, or other suitable material, covered with canvas, unless not required by climatic conditions. The enclosure may be warmed by electric incandescent lights, approved electric heater, steam or hot-water systems, or by other means approved by the inspection department having jurisdiction.

12.—*Protection for Oil and Lamp Rooms.*—When these rooms are located on piers, automatic sprinklers shall be omitted, because of the impossibility of providing safe drainage. In such cases, a system using steam or carbon dioxide as the extinguishing agent, with approved thermostatic control, shall be installed when and as required by the inspection department having jurisdiction.

13.—*Watch Service.*—Approved watch service shall be provided on each pier, with watchmen on duty at all times. Only strong, able-bodied men shall be employed. Watchmen shall be carefully and fully instructed in regard to summoning aid, maintenance and use of all fire appliances, inspection of hazards, and closing of fire doors.

14.—*Fire Alarm Signal System.*—An approved manual fire alarm signal system shall be installed on each pier, arranged to sound a local alarm, and summon the private brigade and public fire department.

15.—*Fire Brigade.*—A private fire brigade shall be organized among the employees on each pier. The "Suggestions for the Organization and Drilling of Private Brigades" by the National Board of Fire Underwriters, is recommended as a guide. The fire brigade shall include a special detail of men to close all fire doors at times of fires and drills.

It will be noted that this report gives the Regulations complete, as your Committee suggests and recommends they be drawn, immediately following

the itemized report on each Section, in order to avoid any misapprehension, due to the changes suggested by items.

In conclusion, your Committee wishes to express its appreciation of the attendance and suggestions of John R. Freeman, Past-President, Am. Soc. C. E., at its meeting in New York, and of the courtesy and assistance of the Secretary of the American Society of Civil Engineers, in providing a place for its meeting, and for typewriting service in the preparation of its preliminary report.

In writing this report, certain verbal and typographic changes were made in the Regulations prepared by the Committee on Docks, Piers and Wharves of the National Fire Protection Association, where it appeared the intention might be more definitely and clearly expressed, and your Committee hopes that its suggestions and recommendations, if approved by the American Society of Civil Engineers, may be of some service in enabling that organization to perfect the Regulations, to the end that they may be adopted by the Port Authorities of the country, and that the fire hazard on docks, piers and wharves may be reduced to a minimum.

Respectfully submitted,

BENJAMIN THOMPSON, *Chairman*,  
JOHN FRANCIS COLEMAN,  
RUDOLPH P. MILLER,  
W. WATTERS PAGON,  
JOHN STEPHEN SEWELL,

November 10, 1923.

*Committee.*

### Progress Report of

### Special Committee to Report on Stresses in Railroad Track\*

TO THE AMERICAN SOCIETY OF CIVIL ENGINEERS:

The Special Committee to Report on Stresses in Railroad Track, co-operating with a similar committee of the American Railway Engineering Association and the American Railway Association (virtually a single committee), presents the following report of progress.

The year 1923 has been occupied with both field and office work. An extensive series of tests was conducted on both straight and curved track on the electrified section of the Chicago, Milwaukee and St. Paul Railway in Montana, in July and August, and another series on four railroads in Virginia, West Virginia, and Pennsylvania, in September, on track with the rail laid both on flat tie-plates and on inclined tie-plates (canted rail).

The tests on the Chicago, Milwaukee and St. Paul Railway were made at various speeds up to 60 miles per hour on straight track, 50 miles per hour on a 6° curve, and 40 miles per hour on a 10° curve. Several types of locomotives were used: General Electric electric freight locomotive, General Electric electric passenger locomotive, Westinghouse-Baldwin electric locomotive, and two distinct modifications of the Westinghouse-Baldwin electric locomotive, and, also, a Mikado steam freight locomotive of the Administration design. Tests were also made with loaded freight cars on both straight and curved track. In addition to the tests made with the stremmatograph to determine the stresses in the two rails under the many and varied conditions referred to, among others were measurements of the tilting and lateral movement of the rails on curves as bearing on track maintenance, and observations of the position of the flanges of the wheels of the locomotive with respect to the edge of rail, in an effort to ascertain the source of flange wear. One of the methods involved the use of copper wire resting on the rail and pulled across it in the interval between the passage of one wheel and the next in such a way that the wire recorded separately impressions for each wheel that passed over it. The amount and the length of the flattenings of the wire and their position gave information on the position of the wheel with respect to the rail and especially as to whether the flange bore strongly against the edge of the rail. As was to be expected, considerable difference was found in the position of the flanges for the several forms of locomotives used.

An interesting set of tests, intended to determine the effect of the regenerative features of the electric locomotive on flange wear, was made by coupling two electric locomotives together and running them around a 10° curve, first with the head one motoring and the other regenerating, and then with the second pushing and the other regenerating. The results compiled thus far appear to show that the position of the flange of the drivers with respect to the edge of the rail is not the same for the two conditions of motoring and regenerating. Sufficient progress in the office work of reading the records and reducing the data has been made to indicate that interesting comparisons may be expected of the stresses in rail produced by the various wheels of these several forms of electric locomotives and those produced by the steam locomotive, both on straight track and on curved track.

\* Presented to the Annual Meeting, January 16, 1924.



The purpose of the tests made in the East was to determine the effect of canting the rail in producing changes in the stress in the rails, both on straight track and on curved track, as having a bearing on the wear of the rail and the maintenance of the track, as well as on the strength of the rail. The tests on the Richmond, Fredericksburg and Potomac Railroad were made on straight track laid with both flat and inclined tie-plates, on a  $2\frac{1}{2}^\circ$  curve with flat tie-plates, and on a  $5^\circ$  curve with canted tie-plates, the weight of the rail being 100 lb. per yd. The tests on the Baltimore and Ohio Railroad were made on 130-lb. rail, with both flat and inclined tie-plates. On the Lehigh Valley Railroad, the 136-lb. rail was laid with inclined tie-plates on both the straight track and the  $10^\circ$  curve used. In all cases, the runs were at 5 and 40 miles per hour, and heavily loaded coal cars were attached to the locomotive for these tests. Not enough progress has been made in compiling the data to indicate whether conclusive evidence has been obtained, but the many auxiliary observations on the tilting and lateral movement on the rails themselves promise to give information of real value.

It is apparent that the office work of making more than 400 000 readings of the stremmatograph records, computing the data, and correlating the various observations otherwise made during the tests, is a time-consuming task. The staff has been increased, and it is hoped that good progress in reducing data and preparing results for presentation will be made during the coming year.

The Committee acknowledges with pleasure the substantial contribution of money for continuing the work that has been made by six companies that manufacture steel rails.

The Committee is making progress on other problems of its program.

Respectfully submitted,

**The Special Committee to Report on Stresses in Railroad Track,**

By **A. N. TALBOT, Chairman,**

**G. H. BREMNER,**

**JOHN BRUNNER,**

**W. J. BURTON,**

**CHARLES S. CHURCHILL,**

**W. C. CUSHING,**

**W. M. DAWLEY,**

**C. W. GENNET, JR.,**

**H. E. HALE,**

**J. B. JENKINS,**

**GEORGE W. KITREDGE,**

**PAUL M. LABACH,**

**C. G. E. LARSSON,**

**G. J. RAY,**

**ALBERT F. REICHMANN,**

**H. R. SAFFORD,**

**EARL STIMSON,**

**F. E. TURNEAURE,**

**J. E. WILLOUGHBY.**

January 16, 1924.

**Progress Report of Special Committee on Irrigation Hydraulics\***

TO THE BOARD OF DIRECTION,

AMERICAN SOCIETY OF CIVIL ENGINEERS.

GENTLEMEN.—The first work of the Committee was the selection of subjects for investigation. About twenty subjects were suggested by the various Committee members, from which, after full consideration, the following eleven subjects were selected:

- 1.—Evaporation Losses from Reservoirs.
- 2.—Losses in Canal Conversions.
- 3.—Water Movement under Dams.
- 4.—Losses in Siphon Spillways.
- 5.—Silt in Canals and Structures.
- 6.—Design of Chutes and Drops.
- 7.—Scouring below Dams.
- 8.—Measuring Irrigation Deliveries.
- 9.—Design of Side Crest Spillways.
- 10.—Permissible Canal Velocities.
- 11.—Maximum Run-Off.

The next work of the Committee was conceded to be the preparation of a complete bibliography of each subject selected. This task was divided among the various members of the Committee, each of whom was assigned a certain list of publications, through which search is being made for data of value. Each article is to be studied and briefly abstracted, suitable cards having been prepared for this purpose. A large part of this work is completed, and it is expected that a fairly complete bibliography will be available by the end of the present year.

A meeting of the Committee was held at the Engineers' Club in San Francisco, Calif., on September 25 and 26, 1923. At this meeting, it developed that an investigation of Subject 11, "Maximum Run-Off," would probably involve some duplication of the work being done by the Special Committee on Flood Protection Data, of which N. C. Grover, M. Am. Soc. C. E., is Chairman. It was decided, therefore, to leave this subject entirely to that Committee.

Research work has been begun on several of the selected lines of study, in co-operation with Government and private agencies. Field tests of a Side Crest Spillway, of certain control drops, and canal conversions, have been made. Some laboratory work on Siphon Spillways has been started. Test wells in various dams have been installed, and some records of water movement under and through them have been secured.

Various devices for measuring irrigation deliveries have been tested, and a system of merit rating for them has been prepared. Some theoretical study has been given to Canal Conversion Losses, Side Crest Spillways, Siphon Spillways, Water Movement under Dams, and Control Structures for Measuring Flow.

The plans for 1924 contemplate a completion of the bibliography of the subjects selected, a continuation of the research work already begun and its expansion to include:

\* Presented to the Annual Meeting, January 16, 1924.

- 1.—The determination of the relative evaporation from standard evaporation pans and a large reservoir surface.
- 2.—Field test on siphon spillways.
- 3.—Laboratory tests on canal conversion.
- 4.—The gathering of certain data by questionnaires sent to irrigation managers and operators.

The Committee takes this occasion to give full credit to the various Government and private agencies that have been and are aiding it in its work. Data of much value are being secured. Some information has already been submitted to the Committee, and more has been promised, for analysis and discussion. It is realized that the Committee is composed of men busy with their own affairs, and that it has very limited funds, none in fact for actual research work. It must depend, therefore, on those who are willing to lend aid and furnish it with the results of their own study. In this light, the Committee becomes a clearing house, where by means of analysis and suggestion the work of others may be directed into channels that will stimulate and co-ordinate the work, tend to prevent duplication, and provide a broad distribution for the results.

It is hoped that in the 1924 appropriation for Committee work a moderate allowance may be included for payment of an Assistant Secretary to cover such time as may be necessary for the preparation of circular inquiries and the compilation of results.

Respectfully submitted,

**D. C. HENNY, Chairman,**

**J. C. STEVENS, Secretary,**

**W. F. ALLISON,**

**B. A. ETCHVERRY,**

**SAMUEL FORTIER,**

**R. L. PARSHALL,**

**J. L. SAVAGE,**

**F. C. SCOBEE,**

**STUART SIMS,**

**FRANKLIN THOMAS.**

**October 12, 1923.**

## Progress Report of the Special Committee on Concrete and Reinforced Concrete Arches\*

TO THE BOARD OF DIRECTION,

AMERICAN SOCIETY OF CIVIL ENGINEERS:

The Special Committee on Concrete and Reinforced Concrete Arches, which was appointed in May, 1923, begs leave to submit the following progress report.

The Committee has held two meetings, one in New York, N. Y., on June 25 and 26, 1923, and one in Conneaut, Ohio, on September 25 and 26, 1923.

At the first meeting, the following resolutions were drawn up and presented to the Board of Direction:

"Whereas, the Board of Direction of the American Society of Civil Engineers has seen fit to appoint a Committee on Concrete and Reinforced Concrete Arches; and

"Whereas, the Committee at its first meeting on June 25 and 26, 1923, in the Engineering Building at 33 West 39th Street, New York, has first discussed the desirability of fully investigating arches of plain and reinforced concrete; and

"Whereas, it finds that engineering knowledge of the attached topics is very meager, limited and uncertain; and

"Whereas, observation has shown that in many cases the fundamental assumptions upon which the generally accepted theory of arch calculations is based are not obtained in practice; and

"Whereas, the effect of the variations from the assumptions are not well known and recognized, and there is a wide divergence of views in connection with the design and construction of arches;

"Be It Resolved: That this Committee herewith recommends to the Board of Direction that it is desirable and primarily in the interest of the public and of the Engineering Profession that an adequate study of the behavior of concrete and reinforced concrete arches be made, which will answer many of the perplexing questions which now confront the designers of such structures, so that economical arches may be designed upon a more scientific basis than has heretofore been possible.

"Be It Further Resolved: That this Committee has carefully considered the nature of the problem before it and recommends that particular stress be placed upon the following topics:

- 1.—The magnitude of shrinkage and its effect upon stresses.
- 2.—The magnitude of temperature changes and their effect upon stresses.
- 3.—The effect of flow of concrete upon stresses.
- 4.—The effect of yielding foundations (horizontally, vertically, and rotational).
- 5.—The effect of yielding of piers during construction.
- 6.—The law of distribution of a concentrated load on a barrel arch.
- 7.—The loads and forces acting upon the falsework of an arch.
- 8.—The lateral stability of narrow and unsupported arch ribs.

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\* Presented to the Annual Meeting, January 16, 1924.



- 9.—The effect of connecting spandrel walls to the barrel of an arch.
- 10.—The investigation of stresses in skewed arches.
- 11.—The magnitude and effect of rib-shortening.
- 12.—A comparison of measured and computed stresses in a multiple-arch elastic system.

*"And Be It Finally Resolved:* That upon due consideration this Committee believes that, since scientific instruments are available that will successfully yield much of the necessary data, it is entirely feasible to proceed with the investigations."

At this meeting of the Committee, a budget for the remainder of the year 1923 was formulated, and sufficient funds to start the work of investigation were requested of the Board of Direction.

There being under construction at Conneaut, Ohio, a multiple-arch bridge that offered opportunity for study of several of the problems enumerated in the resolution, the Committee felt that such opportunity should not be neglected. Three members of the Committee visited the bridge at Conneaut on June 17, 1923, and outlined a program covering several different tests which it was felt were desirable and possible. These tests included:

- 1.—Movement of piers and stresses in piers when adjacent spans are poured and when centers are removed.
- 2.—Stresses in adjacent spans when arches are poured and when centers are removed.
- 3.—Shrinkage effects during the early stages of setting.
- 4.—Temperature and seasonal changes.
- 5.—Loads and forces acting on the falsework.

As construction was proceeding rapidly, the Committee started work without waiting for action by the Board of Direction on its request for funds.

On July 30, 1923, notice was received that the Committee would have available only \$1 200 for all expenses during 1923. As this amount will only meet the clerical and traveling expenses, with a small margin, the Chairman requested aid of the State Highway Department of Ohio, and received authorization from it to incur expenses on the work at the Conneaut Bridge not to exceed \$1 500. With this additional amount available, experimental work proceeded as follows:

- 1.—Apparatus was installed for measuring the yielding of the foundation under both sides of one pier, and observations were taken at various stages of the pouring operations.
- 2.—Strain-gauge points for measuring the deformations of the pier were set, and readings taken at various construction stages.
- 3.—Strain-gauge points were set on two adjacent spans along the neutral axis and around the arch ring at the springing line and crown for measuring deformations, and readings were taken during various construction stages.

- 4.—Holes for internal temperature readings were provided at springing line and crown of two spans and records of temperature changes therein have been made.
- 5.—A duplicate of the crown section, 6 ft. long, was cast at the same time the arch was poured, on supports near the ground, and all measurements and readings on the crown section were repeated on the test specimen, which is free from stresses due to arch action.
- 6.—Readings of the movement of the top of the same pier on which the other observations are in progress, are being taken with a large theodolite set upon a concrete base in a small house built for the purpose.
- 7.—Steel three-hinged arch centers with a tie-rod at the springing line were used for falsework, and strain-gauge readings on the members were taken to determine the loads and reactions.

The bridge consists of seven arches, each of 119 ft. span, center to center of piers, and 32-ft. rise. The roadway is supported by columns resting on two arch ribs. A general elevation of the bridge is shown on Fig. 1.

The readings have not progressed far enough to permit conclusions being drawn, but quite definite evidence of rotation of piers, even though they are on a substantial rock foundation, has been observed. Sufficient data have been obtained to encourage the belief that much valuable information is within reach.

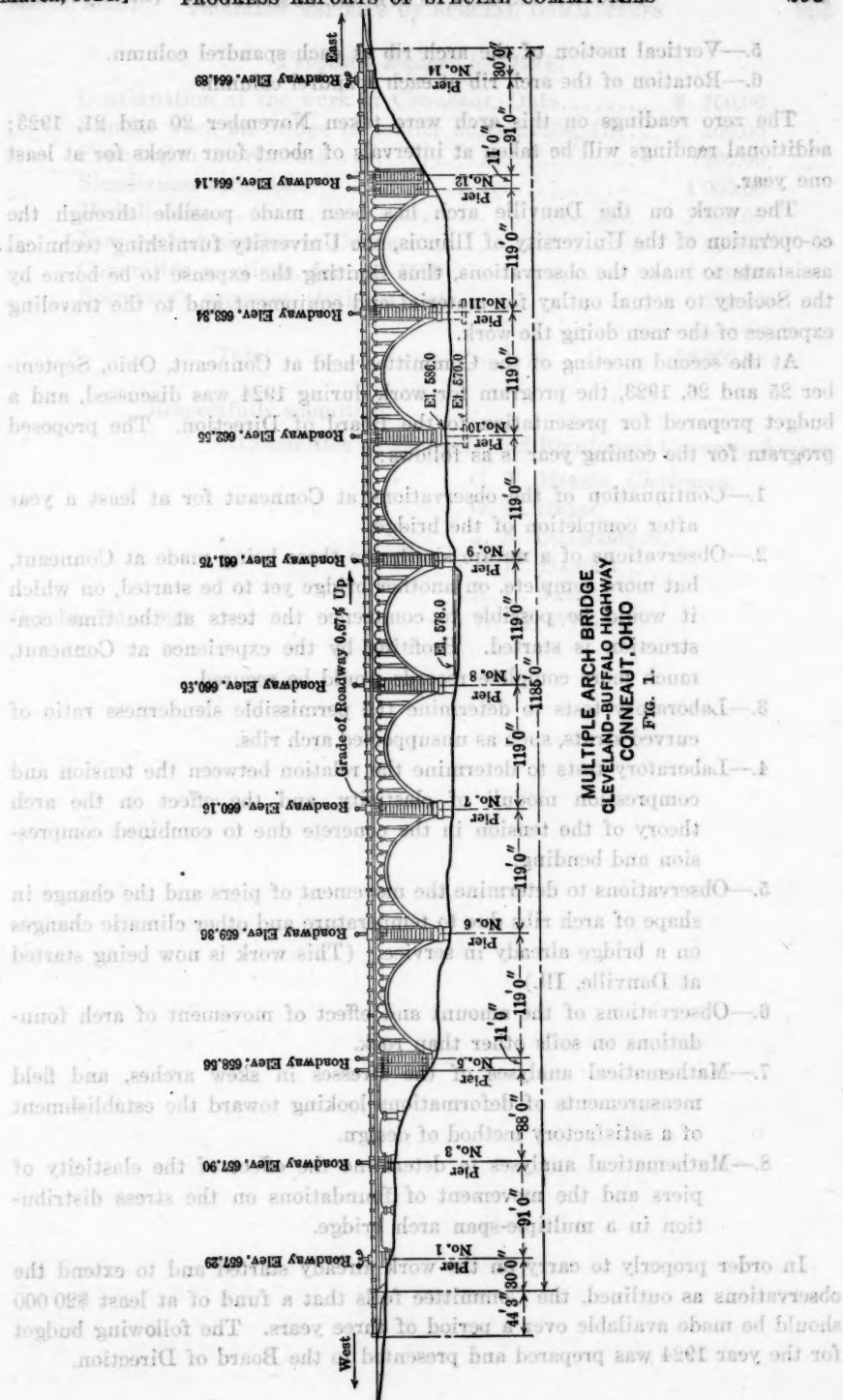
The money made available by the State Highway Department of Ohio will pay for the services of an observer to take readings through the winter, and it is hoped that funds can be secured elsewhere to continue the observations for at least a year, in order to observe the effect of seasonal and temperature changes.

The Committee and the Society are greatly indebted to the State Highway Department of Ohio and particularly to Mr. J. R. Burkey, Resident Engineer at the Conneaut Bridge, for the valuable assistance which they have rendered.

At Danville, Ill., there is a multiple-arch bridge which has been in service for about two years. Due to its favorable location near the University of Illinois, the Committee has started a series of observations on this structure, covering seasonal and temperature changes and their incident deformations.

The observations being made on this bridge include:

- 1.—Strain measurements on the concrete and on the steel near the springing line and near the crown.
- 2.—Temperatures in the concrete near the surface and at the center of the section, on sections near the springing line and near the crown.
- 3.—Variations in the span length.
- 4.—Rotation of piers.



5.—Vertical motion of the arch rib at each spandrel column.

6.—Rotation of the arch rib at each spandrel column.

The zero readings on this arch were taken November 20 and 21, 1923; additional readings will be taken at intervals of about four weeks for at least one year.

The work on the Danville arch has been made possible through the co-operation of the University of Illinois, the University furnishing technical assistants to make the observations, thus limiting the expense to be borne by the Society to actual outlay for material and equipment and to the traveling expenses of the men doing the work.

At the second meeting of the Committee held at Conneaut, Ohio, September 25 and 26, 1923, the program for work during 1924 was discussed, and a budget prepared for presentation to the Board of Direction. The proposed program for the coming year is as follows:

- 1.—Continuation of the observations at Conneaut for at least a year after completion of the bridge.
- 2.—Observations of a nature similar to those being made at Conneaut, but more complete, on another bridge yet to be started, on which it would be possible to commence the tests at the time construction is started. Profiting by the experience at Conneaut, much more complete records would be secured.
- 3.—Laboratory tests to determine the permissible slenderness ratio of curved struts, such as unsupported arch ribs.
- 4.—Laboratory tests to determine the relation between the tension and compression moduli of elasticity, and the effect on the arch theory of the tension in the concrete due to combined compression and bending.
- 5.—Observations to determine the movement of piers and the change in shape of arch ribs due to temperature and other climatic changes on a bridge already in service. (This work is now being started at Danville, Ill.)
- 6.—Observations of the amount and effect of movement of arch foundations on soils other than rock.
- 7.—Mathematical analyses of the stresses in skew arches, and field measurements of deformations looking toward the establishment of a satisfactory method of design.
- 8.—Mathematical analyses to determine the effect of the elasticity of piers and the movement of foundations on the stress distribution in a multiple-span arch bridge.

In order properly to carry on the work already started and to extend the observations as outlined, the Committee feels that a fund of at least \$20 000 should be made available over a period of three years. The following budget for the year 1924 was prepared and presented to the Board of Direction.



*Proposed Budget for 1924:*

Continuation of the work at Conneaut, Ohio.....	\$ 500.00
Similar work on bridge in service at Danville, Ill....	300.00
Foundation movements .....	200.00
Slenderness ratio tests .....	1 000.00
Moduli tests .....	1 000.00
New project similar to Conneaut.....	1 500.00
Committee meetings, four at \$500.....	2 000.00
Secretary's expenses, stationery, etc.....	300.00
<b>Total .....</b>	<b>\$6 800.00</b>

Respectfully submitted,

Committee on Concrete and Reinforced Concrete Arches,

C. T. MORRIS, *Chairman*,

G. E. BEGGS,

J. R. CHAMBERLIN,

E. H. HARDER,

A. C. JANNI,

W. M. WILSON.

October 26, 1923.

## Announcements

The Reading Room of the Society is open from 9 A. M. to 6 P. M., and from 7 P. M. to 10 P. M., every day, except Sundays, New Year's Day, Washington's Birthday, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day; during July and August, it is closed at 5 P. M.

## Future Meetings

**March 5, 1924.—8:00 P. M.**—A regular business meeting of the Society will be held, and a paper by Ford Kurtz, M. Am. Soc. C. E., entitled, "The Hydraulic Design of the Shaft Spillway for the Davis Bridge Dam, and Hydraulic Tests on Working Models", will be presented for discussion.

This paper was published in *Proceedings* for December, 1923.

## Atlanta, Ga., Meeting

The Spring Meeting of the Society will be held at Atlanta, Ga., on April 9, 10, 11, and 12, 1924. The tentative program for the meeting is as follows:

### Wednesday, April 9, 1924:

**10:00 A. M.**—Address of Welcome and Technical Session on "Economics of Hydro-Electric Developments".

**2:30 P. M.**—Technical Session on "The Railroads and the Industrial Developments of the South".

**5:00 P. M.**—Automobile Excursion to Points of Engineering Interest.

**7:30 P. M.**—Informal Dinner, followed by Social Evening and Dancing at the Piedmont Driving Club.

### Thursday, April 10, 1924:

**10:00 A. M.**—Informal Conference of Local Section Representatives and Technical Division Meetings.

**2:30 P. M.**—Excursion to Stone Mountain and other Points of Interest.

**7:30 P. M.**—Informal Dinner and Social Evening at the East Lake Country Club.

### Friday and Saturday, April 11 and 12, 1924:

Excursion to Power Developments of the Georgia Railway and Power Company at Tullulah Lake, Tugalo Lake, and vicinity.

## Searches in the Library

As the Library of the American Society of Civil Engineers has been merged in the Engineering Societies Library, requests for searches, copies, translations, etc., should be addressed to the Director, Engineering Societies Library, 29 West 39th Street, New York, N. Y., who will gladly give information concerning the charges for the various kinds of service. A more comprehensive state-

ment in regard to this matter will be found on pages 35 and 36 of the Year Book for 1923.

### **New Local Sections of the American Society of Civil Engineers**

The Constitutions of the following Local Sections have been approved by the Board of Direction since the list was prepared for the 1923 Year Book, pp. 116 *et seq.*:

**North Carolina Section** (Constitution Approved by Board, October 16, 1923).

Charles E. Waddell, President; Thorndike Saville, Secretary-Treasurer, University of North Carolina, Chapel Hill, N. C.

**Syracuse Section** (Constitution Approved by Board, April 16, 1923).

Louis Mitchell, President; Henry G. Throop, Secretary-Treasurer, 2117 South Geddes Street, Syracuse, N. Y.

### **New Student Chapters of the American Society of Civil Engineers**

The following Student Chapters have been authorized by the Board of Direction since the list was prepared for the 1923 Year Book, pp. 21 *et seq.*:

**College of the City of New York, Organized 1923.**

William Hoffberg, President; Bruce C. Hayter, Secretary, College of the City of New York, New York, N. Y.

**Marquette University, Organized 1923.**

M. Francis Linnan, President; Andrew L. Wapp, Secretary, 908 24th St., Milwaukee, Wis.

**Rice Institute, Organized 1923.**

W. T. Alexander, Jr., President; Paul E. Nash, Secretary-Treasurer, Rice Institute, Houston, Tex.

**University of Alabama, Organized 1923.**

James T. Meador, Secretary, University of Alabama, University, Ala.

**University of Michigan, Organized 1923.**

R. W. Preston, President; William K. Saunders, Secretary, 722 Dewey Avenue, Ann Arbor, Mich.

**University of North Dakota, Organized 1923.**

Ray V. Tilly, President; Richard B. Black, Secretary-Treasurer, 1002 Belmont Avenue, Grand Forks, N. Dak.

**University of Tennessee, Organized 1923.**

B. R. McBath, President; H. N. Estes, Secretary-Treasurer, University of Tennessee, Knoxville, Tenn.

# Membership

(From January 2 to February 5, 1924)

## Additions

MEMBERS		Date of Membership.	
BESSEY, ROY FREDERICK. Asst. Project Mgr., Ship-building Facilities, Yard Development and Storage Section, Bureau of Yards and Docks, U. S. Navy Dept., Washington, D. C.....	}	Assoc. M.	Jan. 14, 1918
		M.	Jan. 14, 1924
BROOKS, ROBERT BLEMKER. Chf. Engr., The Moreno-Burkham Constr. Co., 1213 Syndicate Trust Bldg., St. Louis, Mo.....	}	Assoc. M.	April 25, 1921
		M.	Jan. 14, 1924
CHRISTIE, HANS LANGSTED. Designing Engr., Tower Dept., Am. Bridge Co., Frick Bldg., Pittsburgh, Pa. ....	}	Assoc. M.	Feb. 28, 1911
		M.	Jan. 14, 1924
FARNSWORTH, HOWARD RICHARDS. Member, Manual Board, U. S. Gen. Land Office, Washington, D. C.....	}	Assoc. M.	April 17, 1917
		M.	Jan. 14, 1924
HAMMOND, LEWIS MERRICK. Cons. Engr., 153 Oneida St., Milwaukee, Wis.....	}	Jun.	Mar. 2, 1915
		Assoc. M.	Oct. 9, 1917
	}	M.	Jan. 14, 1924
HARDESTY, SHORTRIDGE. Associate Engr. with J. A. L. Waddell, 35 Nassau St., New York, N. Y.....		Jun.	Sept. 1, 1908
	}	Assoc. M.	Mar. 14, 1916
		M.	Oct. 15, 1923
HILDER, FRAZER CROSWELL. With Public Works Dept., U. S. Navy Yard (Res., 1309 Delafield Pl., N. W.), Washington, D. C.....	}	Jun.	Sept. 6, 1904
		Assoc. M.	April 30, 1912
	}	M.	Jan. 14, 1924
KOLYN, MARION DEN HERDER. Prof., Civ. Eng., Drexel Inst., Philadelphia, Pa.....		Assoc. M.	Jan. 17, 1921
	}	M.	Jan. 14, 1924
LAMBERT, JOHN ROBERT. Asst. Chf. Engr., The Phoenix Bridge Co., 239 Fourth Ave., Phoenixville, Pa. ....		Assoc. M.	April 19, 1920
	}	M.	Jan. 14, 1924
LONG, VERNE VERE. (V. V. Long & Co.), 1300 Colcord Bldg., Oklahoma, Okla.....		Assoc. M.	May 13, 1918
	}	M.	Jan. 14, 1924
		Jun.	Mar. 4, 1913
MAIL, EUGENE FREDERICK. City Engr., Robinson, Ill..	}	Assoc. M.	Jan. 19, 1920
		M.	Jan. 14, 1924
OWEN, ROSCOE. Res. Engr., Frisco Ry., 611 Frisco Bldg., St. Louis, Mo.....	}	Assoc. M.	Sept. 9, 1919
		M.	Jan. 14, 1924
RIESS, JOHN. Civ. Engr. and Gen. Contr., 503 Carondelet Bldg., New Orleans, La.....	}		Jan. 14, 1924
ROSENWALD, JESSE. Associated with Kenneth MacDonald, Jr. and Maurice C. Couchot (Res., 1560 Sacramento St.), San Francisco, Calif.....	}	Assoc. M.	Nov. 25, 1919
		M.	Jan. 14, 1924
RUSSELL, FRANK ALDEN. Prof., Ry. Eng., Dept. of Civ. Eng., Univ. of Kansas, Lawrence, Kans.....	}		Jan. 14, 1924
SARGENT, EDWARD HAYNES. Engr., Hudson River Regulating Dist., 23 South Pearl St., Albany, N. Y.....	}	Assoc. M.	Dec. 31, 1913
		M.	Jan. 14, 1924
TODD, EDWARD NEWTON. Engr., Oklahoma State Highway Dept., Box 663, McAlester, Okla.....	}	Assoc. M.	Nov. 21, 1921
		M.	Jan. 14, 1924



## MEMBERS—(Continued)

Date of  
Membership.

TOWNSEND, JOHN WILLIAM, JR. Engr., Wm. Steele & Sons Co., Philadelphia (Res., Bryn Mawr), Pa. ....		Nov. 26, 1923
TUCKER, HARRY. Prof., Highway Eng., North Carolina State Coll., State College Station, Raleigh, N. C. {	Assoc. M.	Nov. 9, 1920
	M.	Jan. 14, 1924
WALKER, CHARLES LEOPOLD. Prof., San Eng., Cornell Univ. (Res., 201 Fairmount Ave.), Ithaca, N. Y. {	Jun.	April 6, 1909
	Assoc. M.	Feb. 28, 1911
	M.	Jan. 14, 1924
WHITAKER, CHARLES COURTLANDT. Cons. Engr., Rialto Theatre Bldg., Atlanta, Ga. ....		Jan. 14, 1924

## ASSOCIATE MEMBERS

AHEARN, BERTRAM JOSEPH. Asst. Engr. and Section Engr., Board of Water Supply, City of New York, 920 Liberty St., Peek- kill, N. Y. ....		Sept. 10, 1923
ATKINS, DUDLEY, JR. County Engr., Osage County, Lyndon, Kans. ....		Nov. 26, 1923
BAILEY, WILLIAM EDGAR. Dist. Engr., Dist. No. 10, Pennsylvania State Highway Dept., Wellsboro, Pa. ....		Jan. 14, 1924
BEACH, WILLIAM ERNST. With V. D. Simons, 39 South La Salle St., Chicago, Ill. ....		Oct. 15, 1923
CAMPBELL, HARRY VALENTINE. Locating Engr., Eng. Dept., Manila R. R., Manila, Philippine Islands. ....		Nov. 26, 1923
CARLSON, FREDERICK WILLIAM. Res. Engr., Pearse, Greeley & Hansen, Box 192, Michigan City, Ind. ....		Nov. 26, 1923
CRANDALL, CHARLES LEE. Asst. Engr., New York and New Jersey Bridge and Tunnel Comm., 33 South Maple Ave., Ridge- wood, N. J. ....		Sept. 10, 1923
CROWLEY, JAY. Engr., Reclamation Dist. No. 1500, Grafton, Calif. ....		Nov. 26, 1923
DOHERTY, PHILIP JAMES. Res. Engr. of Constr., B. & M. R. R., 39 Union St., Greenfield, Mass. ....		Sept. 10, 1923
ELLSWORTH, SAMUEL MORRISON. Asst. Engr., Weston & Sampson, Boston (Res., 117 Adams St., Braintree), Mass. ....		Sept. 10, 1923
EVANS, LOUIS HUMPHREY. Petroleum Engr., 438 Citizens National Bank Bldg., Los Angeles, Calif. ....		Jan. 14, 1924
FUCIK, JOHN FRANK, JR. Asst. Engr., City of Chicago, 5409 Gladys Ave., Chicago, Ill. ....		Jan. 14, 1924
HACKETT, RUSSELL GRAHAM. Stanford University, Calif. ....		Jan. 14, 1924
HATCHER, MELVIN PROSS. With Burns & McDonnell Eng. Co., 402 Interstate Bldg., Kansas City, Mo. ....		Nov. 26, 1923
HOFFMAN, ABRAM ZANE. Surv. and Regulator (Dist. Engr.), Dept. of Public Works of Philadelphia, 3017 F St., Philadelphia, Pa. ....		Jan. 14, 1924
LA LONDE, HAROLD JULIAN. Field Engr., Portland Cement Assoc. (Res., 7121a Alamo Ave., Hi-Pointe), St. Louis, Mo. ....		Jan. 14, 1924
LATHROP, HENRY MONROE. Asst. Engr., C. R. R. of N. J., Jersey City, N. J. (Res., 42 Fifth Ave., New York, N. Y.) ....	Jun.	June 3, 1915
	Assoc. M.	Sept. 10, 1923
LEAHY, JOHN. Structural Designer, Union Carbide & Carbon Cor- poration, 30 East 42d St. (Res., 528 East 79th St.), New York, N. Y. ....		Jan. 14, 1924

## ASSOCIATE MEMBERS—(Continued)

		Date of Membership.
LIBBEY, VALENTINE BROUSSEAU. Supt., Concrete and Asphalt Products, Hawaiian Contr. Co., Ltd., Honolulu, Hawaii	{ Jun. Nov. 28, 1916 Assoc. M. Nov. 26, 1923	
MECHANIC, JACOB. Asst. Engr., New York and New Jersey Bridge and Tunnel Comm., 915 East 12th St., Brooklyn, N. Y.		Nov. 26, 1923
MENDEZ, ABNER JOHN. Designing Engr., H. E. Skougor, 149 Church St. (Res., 2537 Valentine Ave.), New York, N. Y.		Sept. 10, 1923
NICHOLS, MARVIN CURTIS. Asst. City Engr., 102 East 10th St., Amarillo, Tex.	{ Jun. Nov. 25, 1919 Assoc. M. Jan. 14, 1924	
PECKOVER, HORACE JOSEPH. Engr., Peckover's Ltd., 16 Maynard Ave., Toronto, Ont., Canada		Jan. 14, 1924
PLUMMER, ALEX ALFRED. Contr. and Engr. (A. A. Plummer Co., Ltd.), 1010 Dominion Bldg., Vancouver, B. C., Canada		Sept. 10, 1923
PREGLER, ANTON ANDREW. Engr. in Chg., The Pitometer Co., 50 Church St., New York, N. Y. (Res., 859 Main St., Stamford, Conn.)		Jan. 14, 1924
QUIRK, EDWARD PETER. Engr., Income Tax Unit, U. S. Treasury Dept., Washington, D. C. (Res., 10439 Eighty-ninth Ave., Richmond Hill, N. Y.)		Jan. 14, 1924
RAMIREZ, REINALDO. Asst. Engr., Isobela Irrig. Service, Quebradillos, Porto Rico		Sept. 10, 1923
RICHARDSON, NORMAN DAYTON. Asst. Engr., Narrows Tunnel Comm., Board of Estimate and Apportionment, New York City (Res., 1665 Nelson Ave.), New York, N. Y.		Jan. 14, 1924
SCHNEIDER, EDWARD JOHN. 1406 General Taylor St., New Orleans, La.		Jan. 14, 1924
SCHNEIDER, EMIL HERBERT. Chf. Engr., Cunningham & Foley, Inc., 14 West 45th St., New York (Res., 1047 Eighty-third St., Brooklyn), N. Y.		Nov. 26, 1923
SMITH, STEWART TRACEY. Architectural Engr., Van R. H. Greene, 35 Warren St., New York (Res., Prospect Park, White Plains), N. Y.		Sept. 10, 1923
SMITH, WILLIAM HENRY. Highway (Materials) Engr., U. S. Bureau of Public Roads, Federal Dist. No. 10, Washington, D. C. (Res., 2413 West North Ave., Baltimore, Md.)		Nov. 26, 1923
STEVENS, FRANK BURTON, JR. 1486 Collingwood Ave., Detroit, Mich.		Sept. 10, 1923
STOCKWELL, HARRY DAVID. Field Engr., Braden Copper Co., Sewell, Rancagua, Chile	{ Jun. Oct. 14, 1919 Assoc. M. Nov. 26, 1923	
SWITZER, HERMAN JOSEPH. Care, William H. Bowne, 48 Highland Ave., Glen Cove, N. Y.		Oct. 15, 1923
TAUB, EDWARD SAMUEL. Senior Asst. Engr., Morris Knowles, Inc., 507 Westinghouse Bldg., Pittsburgh, Pa.		Jan. 14, 1924
THOMAS, BURTIS PAUL. City Engr., Masonic Temple, La Porte, Ind.		Jan. 14, 1924
UPTON, THOMAS HAYNES. Lecturer in Civ. Eng. and in Chg. of Civ. Eng. Dept., Univ. of Melbourne, Carlton, Victoria, Australia		Nov. 26, 1923

## ASSOCIATE MEMBERS—(Continued)

Date of  
Membership.

VAN BUREN, MAURICE PELHAM. Chf. Draftsman, Kal-	} Jun.	Jan. 15, 1917
man Steel Co., 110 East 42d St. (Res., 100		
West 59th St.), New York, N. Y.....	Assoc. M.	Jan. 14, 1924
VAN WAGNER, WALTER MARTIN. Res. Borough Engr. of Roselle,		
222 Chestnut St., Roselle, N. J.....		July 9, 1923
WILKINSON, WINSOR DORNIN. With C. C. Kennedy, San Francisco		
(Res., 2525 Benvenue Ave., Berkeley), Calif.....		Jan. 14, 1924

## JUNIORS

CARTER, HAROLD SAMUEL. Civ. Eng. Dept., Iowa State Coll., Ames,		
Iowa .....		Jan. 14, 1924
COLLISSON, NORMAN HARVEY. Asst. Engr., William H. Collisson,		
Jr., 334 Central Ave., Ocean City, N. J.....		Nov. 26, 1923
COMEGYS, CHARLES PAGE. Insp., Maryland State Roads Comm.,		
Box 6, Chestertown, Md.....		Jan. 14, 1924
DAVIS, CAMERON LLOYD. 253 James Ave., S. E., Grand Rapids,		
Mich. ....		Nov. 26, 1923
DIMOCK, STUART MARSHALL. 131 Hudson Ave., Red Bank, N. J..		Nov. 26, 1923
DOLLIVER, EMERSON. 817 Fifth Ave., San Rafael, Calif.....		Jan. 14, 1924
DOWNES, ERNEST WALDO. Junior Engr., U. S. Geological Survey,		
2500 Custom House, Boston, Mass.....		Jan. 14, 1924
EISENSTAT, SAMUEL ARNOLD. 124 East 103d St., New York, N. Y.		Nov. 26, 1923
LA MONTAGNE, HENRY CASTOR. Cascade Inn, Shawinigan Falls,		
Que., Canada.....		Nov. 26, 1923
PEARCE, CECIL EDWARD. Office Engr., Don Pedro Project for R. V.		
Meikle (Res., 242 Laurel St.); Turlock, Calif.....		Nov. 26, 1923
REED, OREN. R. R. No. 2, St. Paul, Ind.....		Jan. 14, 1924
SHACKLETT, JOHN WILSON. Care, Nashville Bridge Co., Nashville,		
Tenn. ....		Jan. 14, 1924
STETLER, MARVIN MAYFIELD. Structural Engr., Mosher Steel &		
Machinery Co., Box 238, Dallas, Tex.....		Nov. 26, 1923
SWINTON, GEORGE ROBERT. Asst. Engr., Keystone State Constr.		
Co., Spangler, Pa.....		Nov. 26, 1923
WERMECKE, KASPER DE NYSEN. Rodman, Field Engr.'s Office,		
Clairton By-Products Coke Plant, Carnegie Steel Co., Clair-		
ton, Pa. ....		Jan. 14, 1924

## Reinstatements

## MEMBERS

Date of  
Reinstatement.

SCHLUMPF, OSCAR LEONARD.....	Jan. 14, 1924
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## Deaths

- BARDURY, JUAN BATISTE HIPOLYTE. Elected Associate Member, April 2, 1913; died September 20, 1923.
- BRITT, DUDLEY DIGGES. Elected Member, April 1, 1908; died April 23, 1923.

CHESTER, CHARLIE ELLSWORTH. Elected Associate Member, May 4, 1898; died January 4, 1924.

CROSBY, BENJAMIN LINCOLN. Elected Junior, June 2, 1880; Member, October 6, 1886; died January 26, 1924.

HAYES, ANDREW JENKINS. Elected Associate Member, September 6, 1910; died January 19, 1924.

REASONER, RICHARD BARKLEY. Elected Associate Member, January 19, 1920; died July 9, 1923.

REIMER, WILLIAM HENRI VALE. Elected Member, March 6, 1907; died December 12, 1923.

SMITH, HENRY DEWITT. Elected Member, December 6, 1893; died December, 1922.

TWITCHELL, FREDERICK GEORGE. Elected Associate Member, December 6, 1920; date of death unknown.

VINCENT, EDWARD FRANKLIN. Elected Member, August 31, 1909; died December 29, 1923.

WELLS, EDWARD HYDE, JR. Elected Associate Member, May 28, 1923; died December 18, 1923.

WOODWARD, FRANK COX. Elected Associate Member, June 30, 1911; Member, January 14, 1919; died December 21, 1923.

WULF, EBERHARD JOHN. Elected Member, May 6, 1914; died October 24, 1923.

### Total Membership of the Society, February 5, 1924

Members .....	4 838
Associate Members.....	5 318

Corporate Members..... 10 156

Honorary Members..... 13

Juniors..... 612

Affiliates..... 159

Fellows..... 6

**Total ..... 10 949**

### Reinstallments

### Deaths



## Employment Service

The Engineering Societies Employment Service is under the joint management of the National Societies of Civil, Mining, Mechanical, and Electrical Engineers as a co-operative Bureau available only to their membership, and maintained by the contributions from the Societies and their individual members who are directly benefited.

**Men Available.**—Under this heading, brief announcements will be published without charge. These announcements will not be repeated, except on request received after an interval of one month. Names and records will remain in the active files of the Bureau for a period of three months and are renewable on request. Notice for *Proceedings* should be addressed to Employment Service, 33 West 39th Street, New York, N. Y., and should be received prior to the first of the month.

**Opportunities.**—A Bulletin of engineering positions available is published weekly and is available to members of the Societies concerned at a subscription rate of \$3 per quarter, or \$10 per annum, payable in advance. Positions which are not filled promptly as a result of publication in the Bulletin, may be announced herein.

**Voluntary Contributions.**—Members obtaining positions through the medium of this Service are invited to co-operate with the Societies in the financing of the work by nominal contributions made within thirty days after placement, on the basis of \$10 for all positions paying a salary of \$2 000 or less per annum; \$10 plus 1% of all amounts in excess of \$2 000 per annum; temporary positions (of one month or less), 3% of total salary received. The income contributed by the members, together with the finances appropriated by the four Societies named, will be sufficient, it is hoped, not only to maintain but to increase and extend the service.

**Replies to Announcements.**—Replies to announcements published herein, or in the Bulletin, should be addressed to the key number indicated in each case, with a two-cent stamp attached for re-forwarding, and forwarded to the Employment Service at the address given. Replies received by the Bureau after the positions to which they refer have been filled, will not be forwarded.

### MEN AVAILABLE

**CIVIL ENGINEER**, Assoc. M. Am. Soc. C. E.; Technical graduate; married. Eighteen years' experience on construction, design, estimating, specifications for municipal improvements, buildings, bridges, land drainage, industrial plant layouts, and maintenance. Available for executive position April 1, 1924. State of Michigan license. Location, North Central States. B-768.

**MANAGING DIRECTOR**, of firm in Brazil; M. Am. Soc. C. E., located at Rio, desires to represent or report on American interests operating or intending to operate in Brazil. B-2678.

**SUPERINTENDENT AND ENGINEER**; age, 43. Practical man, with twenty years' experience in handling men on construction contracts, desires to form connection

with contractors. Experience covers actual costs, preparation of bids, organization, and supervision of subways, foundations underpinning buildings, water-works, dams, sewers, and all classes of concrete work. B-4680.

**GRADUATE CIVIL ENGINEER**; wishes to locate in or near Boston, Mass. Experienced in power-house design and construction, with some sales work. B-5363.

**THIRTY YEARS' EXPERIENCE** in general municipal engineering, including water-works construction and maintenance, power plant, filtration, tunnels, reservoirs, street construction, snow-handling, considerable writing for publication on engineering subjects, tests, handling of men by day and contract. Not less than \$3 000. B-5382.

**JUNIOR, AM. SOC. C. E.; B. A. I. (T. C. D.), 1922.** Highly efficient in advanced mathematics, and experienced in city planning drafting and traffic research work. Wishes Civil Engineering position, affording good opportunity for advancement in responsibility of control or design. Remuneration secondary importance to opportunity of sound experience in some practical engineering project. Available May 1, 1924. B-6280.

**GRADUATE CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; M. Am. Ry. Eng. Assoc.; age 31; married.** Seven years' maintenance and construction of railroad buildings, bridges, tracks, etc. More than four years in responsible charge. Now employed, but desires position in engineering department of railroad with good opportunities for advancement. Salary, \$300. B-6313.

**CONSTRUCTION MANAGER; American;** University education; age 36. Experienced in every department of building construction; has held executive positions with leading firms, architects, contractors, and technical manufacturers. Good organizer and driver. Has had foreign experience. New York and Western references. New York interview. B-6364.

**ENGINEER; Graduate Mass. Inst. Tech., 1913.** Recently employed as resident engineer of construction with a State department on road work, drainage systems, bridges, etc. Work included investigations, estimates, reports, and executive supervision, also installation of unit cost system. Excellent references. Well qualified for responsible position with State highway department, city or town, large contractor specializing in highway work, or for educational or promotional work in highway field. Available on short notice; any location. Salary dependent on position and future. B-6574.

**GRADUATE CIVIL ENGINEER, with broad foreign experience, desires to act as representative of American Company engaged in obtaining concessions or carrying on extensive work abroad.** B-7147.

**EXPERIENCED ENGINEER** desires position with company engaged in engineering contracts or company operating an industrial plant. Location preferred, east of Kansas and north of Tennessee. Has had a broad experience in designing, construction, and management, both on the side of the purchaser and of the contractor. B-7173.

**GRADUATE CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; age 30; married.** Seven years' experience teaching strength of materials, hydraulics, and structures in university; also, practical structural and railroad experience. Desires appointment as assistant professor of civil engineering for the academic year 1924-25. B-7261.

**ESTIMATOR AND GENERAL SUPERINTENDENT; College graduate, civil engineering;** experienced in general building construction. Desires position in general contractor's office. Location, East, South, or foreign service. B-7273.

**ENGINEER; age 43; married.** Twenty years' experience on construction of all kinds, location, grade revision, and new work; Manager of production. Last four

years, plant engineer in charge maintenance and construction; maintenance and operation, power-houses, reporting to president of large industry; home, Bloomfield, N. J. B-7281.

**ENGINEER EXECUTIVE, Assoc. M. Am. Soc. C. E.; University graduate.** Twenty-one years' active engineering and business experience in irrigation, land development, concrete construction; last ten years in responsible charge, intensive development enterprises, with record of low costs on high-grade construction. Desires connection in which past training may be fully capitalized. Western location preferred. Available March. B-7282.

**CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; age 36; married; American; speaks Spanish fairly well.** In responsible charge for several years of railway location and construction. Also, irrigation, construction and designing flumes, etc.; general surveying over number of years, private work; city street construction, two years. Open for employment. Immediate acceptance in this or foreign country. B-7297.

**CIVIL ENGINEER, Assoc. M. Am. Soc. C. E.; Graduate C. E.; married.** Has had charge of building construction and broad experience in purchase and handling of engineering supplies. More than five years on Panama Canal construction, in charge of stevedoring, following up materials, supply upkeep. Competent employment manager. Understands Spanish. Available on 15 days' notice. B-7298.

**CIVIL ENGINEER EXECUTIVE, M. Am. Soc. C. E.; American; age 43; married; health excellent.** Honest, capable, energetic. Educated in United States and abroad. Extensive experience in North and South America, on railroad location, construction, drainage, organization, design, and construction, industrial plant layout and construction. Better qualified as an organizer and executive than along strictly technical lines. Permanent location desired. Salary secondary to interest in business or profits. B-7312.

**ENGINEER - ESTIMATOR - SUPERINTENDENT OF CONSTRUCTION, Assoc. M. Am. Soc. C. E.; age 36; married.** Twenty years' experience in surveys, water supply, sewerage, and municipal engineering construction, quantity surveys, and construction cost detail. Qualified for position with consulting engineers, contractors, or public utility construction company, or as Resident Engineer. B-7328.

**TRANSITMAN.** Two years' experience, municipal improvement, city surveying, desires connection with engineering concern where advancement through hard work is assured. Salary, \$35. Location, New York City. B-7347.

**IRRIGATION ENGINEER, M. Am. Soc. C. E.; Graduate C. E.; American; age 43; married.** Experience covers all phases of irrigation engineering and development. Past four years, investigating irrigation projects for State and Federal Departments. Desires position as engineer or project manager for irrigation or colonization project. Resident of California and prefers location in or near that State. B-7374.

**CIVIL ENGINEER**, Jun. Am. Soc. C. E.; technical graduate; American; age 26; family. Four years' engineering experience, location and construction State highways, irrigation, and water storage works. Desires position offering good future, preferably in oil, irrigation, railroad, or mining work, in California, Mexico, Central or South America. Available at once. B-7375.

**CIVIL ENGINEER**. Experienced on railroad construction, especially structural work, mill buildings, steel and concrete design. Taught Bridge Design for two years; until recently chief engineer for firm of contracting engineers in South, doing highway and building work. Connection near New York City as Engineer or Chief Draftsman desired. Salary \$8 000. B-7376.

**CIVIL ENGINEER**, M. Am. Soc. C. E. More than thirty years' varied experience in railway, structural, and bridgework, water supply, sewers and sewage disposal, irrigation, hydraulic power development, industrial plants, and general consulting work; open for engagement in position of responsibility. Familiar with Middle West and Pacific Coast and would consider position with investment or development company. B-7379.

**SUPERVISING ENGINEER**; Graduate C. E. from well known technical institute; age 37. Experience covers 14 years. Roads, pavements, concrete stand-pipes, monumental long span arch bridges. Traveled extensively. Can fit into any organization requiring responsibility, knowledge of contracts, specifications, estimates, execution of contract, or day labor work. Desires connection with future executive possibilities. B-7381.

**MEMBER, AM. SOC. C. E.**, 25 years' experience in municipal work, surveys, plans, specifications, etc., on water-works, sewers, etc.; 8 years in office of prominent consulting engineer; 25 years' experience in editorial work on the preparation of technical books and papers. Work of the latter kind preferred. Continuous or part time. Interview requested. B-7385.

**ENGINEER**; age 32; married; employed. Experience in designing and estimating building construction, seeks opening as Sales Engineer or Assistant to Executive. B-7387.

**ASSOCIATE MEMBER** Am. Soc. C. E., with experience in steel construction of some of the largest buildings in New York City and vicinity, wishes opportunity to assist in preparing design plans, estimates, shop details, in spare time. Anxious to interest those particularly who do not wish to permanently engage Engineer or Draftsman. B-7401.

**CIVIL ENGINEER**; Columbia University graduate; broad experience. Desires position as Chief Engineer in some Southern city. Has been Chief Engineer in city of 80 000 for past six years, supervising all construction work; sewer design and construction, regulating, grading and paving, viaducts, City Planning, topographical surveys, and maintenance of sewers and highways. B-7403.

**MEMBER, AM. SOC. C. E.** Available May 1, 1924. Executive position desired with structural steel manufacturer. Twenty years' experience covering detailing, designing, estimating, cost keeping, advertising, sales, and sales management. B-7445.

**WATER-WORKS MANAGER AND ENGINEER**; Graduate engineer; age 38. Eighteen years' experience in the design, construction, and operation of municipal, railroad, and industrial water supply and purification plants. Eastern location desired; available about May 1. B-7456.

**MEMBER, AM. SOC. C. E.**, 25 years' experience in municipal work, surveys, plans, specifications, etc., on water-works, sewers, etc.; 8 years in office of prominent consulting engineer; 25 years' experience in editorial work on the preparation of technical books and papers. Work of the latter kind preferred. Continuous or part time. Interview requested. B-7385.

## Additions to Engineering Societies Library\*

(From January 1 to January 31, 1924)

The statements made in these notices are taken from the books themselves, and this Society is not responsible for them.

### MAILING LIST DIRECTORY AND CLASSIFIED INDEX TO TRADE DIRECTORIES

By Linda H. Morley and Adelaide C. Kight under the Direction of John C. Dana. N. Y., McGraw-Hill Book Co., 1924: 727 pp., 9 x 6 in., cloth. \$10.00.

This volume contains an elaborate index to about 1500 trade directories, covering 1300 trades. The directories are indexed under many topics, so that it is possible to determine quickly where information on any specific point can be found. Full titles, publishers, dates of issue, and prices are given. The book will be very useful to compilers of mailing lists, sales departments, buyers, libraries, and others seeking information on trades and markets.

### STATISTICAL BIBLIOGRAPHY

In Relation to the Growth of Modern Civilization. E. Wyndham Hulme, Lond., 1923. (Gift.)

### BROOKLYN DAILY EAGLE ALMANAC, 1924.

(Purchase.)

### ANNUAIRE STATISQUE DE LA BELGIQUE ET DU CONGO BELGE, 1920-21.

Belgium-Ministère de l'Interieur et de l'Hygiène. (Gift.)

### MORTALITY RATES, 1910-1920.

U. S.-Bureau of the Census. Washington, D. C., 1923. (Gift.)

### PRICE OF COAL, ANTHRACITE AND BITUMINOUS.

American Academy of Political and Social Science; *Annals*, January, 1924. (Gift.)

### WOMEN IN SOUTH CAROLINA INDUSTRIES.

U. S.-Women's Bureau. Washington, D. C., 1923. (Gift.)

### CONFERENCE ON MINE TAXATION

American Mining Congress, 26th Annual Convention; *Proceedings*, 1923. (Gift.)

### STUDIES IN THE ECONOMICS OF OVERHEAD COSTS.

By J. Maurice Clark. Chicago, Univ. of Chicago Press, 1923. 502 pp., 9 x 6 in., cloth. \$4.00.

The subject of this book, Professor Clark states, may be defined as "a study of discrepancies between an ever-fluctuating demand and a relatively inelastic fund of productive capacity, resulting in wastes of partial idleness, and many other economic disturbances. Unused capacity is its central theme." In studying this question of costs which are not traced to units of output or do not vary with output, the author attempts to utilize both the conception of cost of the cost accountant and of the economist, and to draw conclusions which will be of value to the business man. The book is based on a course given to students of Business and Political Economy at the University of Chicago.

### FINANCIAL ENGINEERING.

By O. B. Goldman. Second Edition. N. Y., John Wiley & Sons; Lond., Chapman & Hall, 1923. 325 pp., diagrams, tab., 9 x 6 in., cloth. \$3.50.

The aim of the author is to furnish rules by which the engineer may determine the economic value of the different types of machines and installations of machinery. He endeavors to set forth the method of determining the installation which will give the greatest financial efficiency, although not necessarily the greatest mechanical efficiency. The

\* Unless otherwise specified, the reviewed books in this list have been donated by publishers.



new edition has been revised and extended. Contents: Introduction; Fundamental Financial Calculations; Basic Costs and Vestances; Unit Cost Determination; Determination of Size System for Best Financial Efficiency; Determination of Type and Size of Units.

# INDUSTRIEBETRIEBSLEHRE.

By E. Heidebroek. Berlin, Julius Springer, 1923. 285 pp., illus., charts, 11 x 8 in., boards. \$4.20.

This book contains a thoughtful discussion of the main problems of industrial management, cost, factory organization, wages, depreciation, and maintenance, with examples of cost systems for power plants and machine works. The book is not intended for beginners, but for manufacturers and managers of experience who wish a connected elucidation of the broad principles of efficient management.

# INDUSTRIAL MANAGEMENT.

By Richard H. Lansburgh. N. Y., John Wiley & Sons; Lond., Chapman & Hall, 1923. 488 pp., illus., charts, tab., 9 x 6 in., cloth. \$4.50.

Professor Lansburgh has aimed to present a co-ordinated, simple treatment of the problems, the ideals, and the methods of successful industrial management in a manner that is at the same time broad and specific and which indicates the responsibilities of the factory executives to the workers, the owners, and the community. The book covers the whole field and is illustrated by examples chosen from a large variety of industries. The point of view is that of the medium-sized plant.

# COURSE IN PERSONNEL ADMINISTRATION: SYLLABUS AND QUESTIONS

By Ordway Tead. N. Y., Columbia Univ. Press, 1923. 246 pp., 9 x 6 in., cloth. \$3.00.

This book was originally prepared as the textbook for the Home-Study Course offered by Columbia University. It follows substantially the outline of material used in Tead and Metcalf's "Personnel Administration" and includes questions regarding that text, but it offers additional explanatory matter on various important phases of the subject and contains, as appendices, recent documents that illuminate various questions. The work will be useful as a syllabus and guide to reading, both for students and for those engaged in industry.

# LAW CHARTS AND PATENT ENGINEERING.

Harry H. Semmes and H. R. Van Deventer. Washington, D. C., 1922. (Gift.)

# REPORT OF JOHNS HOPKINS UNIVERSITY

On the Schools of Engineering, Its Organization, Operation, and the Award of Scholarships, January, 1924. (Gift.)

# LEAGUE OF NATIONS.

Second General Conference on Communications and Transit. Preparatory Documents: 1, Railways; 2, Marine Ports; 3, Electric Questions. (Gift.)

# PROGRAM OF ACTIVITIES OF THE INTER-AMERICAN HIGH COMMISSION;

October 22, 1923. Washington, D. C. (Gift.)

# IN THE MATTER OF CONSOLIDATION OF THE RAILWAY PROPERTIES

Of the United States into a Limited Number of Systems; Statement of Elgin, Joliet & Eastern Ry. Co. Alexander French Banks. Chic., 1923. (Gift.)

# ALLEN'S SYNONYMS AND ANTONYMS.

By Frederic Sturges Allen. N. Y., 1921. (Purchase.)

# PRINCIPLE OF RELATIVITY.

By H. A. Lorentz, A. Eistein, H. Minkowski, and H. Weyl. N. Y., Dodd, Mead & Co., 1923. 216 pp., diagrams, 9 x 6 in., cloth. \$4.00.

This is a translation of "Das Relativitätsprinzip", which appeared several years ago. The papers here collected are by some of the foremost students of the theory, and the collection is intended chiefly to exhibit the manner in which the theory gradually grew under the stimulus of physical experiment.

# ANNUAIRE POUR L'AN 1924.

France-Bureau des Longitudes. Paris, Gauthier-Villars et Cie., 1923. 658 + 161 pp., tab., 6 x 4 in., paper. 6 francs.

The Annuaire for 1924, like its predecessors, contains a useful collection of tables and other data on astronomy, geodesy, chemistry, physics, and commerce. In addition, there

are biographical notices on Louis Favé, Chief Hydrographic Engineer of the French Navy, and Abraham Breguet, the famous horologist; an article on the problem of the hour, by G. Bigourdan; one on the distances of the stars, by M. Hamy; and a historical note on the scientific work of Copernicus, by the last author.

#### SMITHSONIAN MATHEMATICAL FORMULAS AND TABLES OF ELLIPTIC FUNCTIONS.

E. P. Adams and R. L. Hippisley. (Smithsonian Miscellaneous Colls., v. 74, No. 1.) Washington, D. C., 1922. (Gift.)

#### PLAN READING AND QUANTITY SURVEYING.

By Charles F. Dinghan. N. Y., McGraw-Hill Book Co., 1924. 201 pp., diagrams, 7 x 4 in., fabrikoid. \$2.50.

This pocket-book is intended to explain the methods for scaling quantities from plans and setting them down in proper form for use by the estimator. The book is devoted to building construction and does not purport to include the application of quantity surveying to bridges, railroads, and other engineering structures.

#### REPORT, 1922.

National Physical Laboratory. Lond., 1923. (Exchange.)

#### STUDIO SULLA CAPACITÀ DEI CAVI AD N CONDUTTORI CORDATI.

Ettore Sacchetto. 1923. (Gift.)

#### EINE DARSTELLUNG DES NERNST'SCHEN WARMETHEOREMS.

By Victor Fischer. Frankfurt a. M., Universitätsdruckerei Werner u. Winter, 1923. 2 pts., 9 x 6 in., paper. (Price not given.)

Starting from geometric conceptions, the author aims to give a rigid presentation of the Nernst heat theorem and to show how it may be generalized and used for obtaining an equation of state, which will simultaneously answer for infinitely small temperatures and infinitely great pressures.

#### THERMODYNAMICS, RECAPITULATED ON THREE PAGES

With an Outline of a Consistent Method of Study. Paul A. Cushman, 1923. (Gift.)

#### MODERN ELECTRO-PLATING.

By W. E. Hughes. (Oxford Technical Publications.) Lond., Henry Frowde & Hodder & Stoughton, 1923. 160 pp., pl., tab., 10 x 6 in., cloth. \$5.35. (Gift of Oxford University Press, American Branch.)

This book is not intended as a textbook, but as a help to platers, chemists, and engineers in search of practical, modern information on the electro-deposition of the metals of general interest in engineering. The first chapter is a general review of the subject. This is followed by chapters on theory, on the preparation of work, on the deposition process, and on finishing. The various metals, iron, nickel, zinc, lead, tin, chromium, and copper are then considered at length. A chapter on the structure of deposited metal, and one on recommended reading end the volume. Numerous references and bibliographies add to the value of the book.

#### CHEMISCHEN LITERATUR-REGISTER DER ORGANISCHEN CHEMIE.

Herausgegeben von der Deutschen Gesellschaft, redigiert von Robert Stelzner. Vol. 4, 1916-1918. Berlin, 1923. (Purchase.)

#### CHEMISCH-TECHNISCHE VORSCHRIFTEN:

v. 1, Metals and Minerals; v. 2, Fasern, Massen und Schichten. Otto Lange. Third Edition. Leipzig, 1923. (Purchase.)

#### VALENCE AND THE STRUCTURE OF ATOMS AND MOLECULES.

By Gilbert Newton Lewis. (American Chemical Society. Monograph Series.) N. Y., Chemical Catalog Co., 1923. 172 pp., diagrams, tab., 9 x 6 in., cloth. \$3.00.

This book contains a summary of modern views concerning the structure of the atom and the molecule and the nature of the chemical bond. The author has brought together the results obtained by chemists and physicists and united them in a connected account. The book is intended to show the present state of knowledge and to suggest the directions in which further research is needed.

#### RADIO-ACTIVITY.

By K. Fajans. N. Y., E. P. Dutton & Co., [pref. 1922]. 138 pp., diagrams, tab., 9 x 6 in., cloth. \$3.50.

A translation of a German work which has passed through four editions in three years, this book is a readable volume, intended for those desiring a general account which does not call for great previous knowledge of physics and chemistry. The book should appeal to general readers who wish information about the progress made in the study of the chemical elements, as a result of radio-active investigations. It should also be of use to physicists and chemists who wish to review recent developments. Numerous bibliographic notes are included.

**SUMMARY OF PROCEEDINGS, 1922-1923.**

Society of Economic Geologists. (Gift.)

**GENERAL MINING LAWS.**

Effective July 1, 1923. Illinois-Dept. of Mines and Minerals. Springfield, Ill., 1923. (Gift.)

**DIATOMACEOUS EARTH.**

Great Britain-Imperial Mineral Resources Bureau. Mineral Industry of the British Empire and Foreign Countries: Statistics, 1919-21. Lond., 1923. (Purchase.)

**FINAL DISPOSITION OF SOME AMERICAN COLLECTIONS OF MINERALS.**

Comp. by Frederick A. Canfield. Dover, N. J., 1923. (Gift.)

**BIBLIOGRAPHY OF INDIAN GEOLOGY; Pt. 3:**

Index of Subjects. Comp. by T. H. D. La Touche. Calcutta, 1923. (Gift.)

**REPORT ON THE EROSION AND PROTECTION OF THE NEW JERSEY BEACHES.**

New Jersey-Board of Commerce and Navigation. 1922. (Gift.)

**MEASUREMENT, COMPRESSION, AND TRANSMISSION OF NATURAL GAS.**

By Lester Clyde Lichty. N. Y., John Wiley & Sons, 1924. 523 pp., illus., diagrams, tab., 9 x 6 in., cloth. \$7.50.

This book is intended to meet the need for a textbook for students in engineering schools and also to assist the practical man who wishes a knowledge of the principles involved in field work and of the construction and operation of the apparatus used. Technical formulas are developed, so that the factors involved can be studied. Charts are given which eliminate calculations, and apparatus and machinery are described.

**SCIENCE AND ITS SERVICE TO MAN.**

Sir George H. Knibbs. Wellington, Australia, 1923. (Gift.)

**PROCEEDINGS, 1922-23, Vol. 9.**

New Zealand Society of Civil Engineers. (Exchange.)

**PROCEEDINGS, 1923, Vol. 23, Pt. 1-2.**

American Society for Testing Materials. (Exchange.)

**KIDWELL TWO-FLOW RING-CIRCUIT WATER-TUBE BOILER.**

Edgar Kidwell. (Gift.)

**STATIONARY STEAM ENGINEERS AND BOILER OPERATORS**

License Laws and Rules Governing the Examinations of Applicants for Licenses, Issued March, 1923. Ohio-Dept. of Industrial Relations. (Gift.)

**MECHANICAL STOKING.**

By David Brownlie. (Pitman's Technical Primers.) Lond. and N. Y., Isaac Pitman & Sons, 1923. 234 pp., illus., diagrams, tab., 7 x 4 in., cloth. \$1.20.

This book is written from a severely practical point of view. After a short historical account of the beginnings of mechanical stoking, the author describes every make of stoker for stationary steam boilers which is actually on the market in Great Britain to-day.

**AMERIKANISCHE UND DEUTSCHE GROSSDAMPFKESSEL.**

By Friedrich Münzinger. Berlin, Julius Springer, 1923. 178 pp., illus., diagrams, 9 x 6 in., paper. \$1.50.

The lack of interchange of ideas between Germany and America during the World War and the difference in conditions in the two countries have brought about a greater difference in boiler-making than existed before the war. Dr. Münzinger has thought, because of this,

that an accurate picture of American practice in large boiler plants would be of interest to German engineers. He has, therefore, written this work, which gives a comprehensive survey of American practice and compares those features which he considers important and essential with the corresponding German designs and concepts. Stokers, the use of powdered coal, boilers, superheaters, economizers, air preheaters, high-pressure boilers, boiler settings, feed-water treatment, and heat accumulators are discussed.

#### PROCEEDINGS.

National Electric Light Association. 29th Convention, 1906, v. 3; 31st Convention, 1908, v. 2. (Gift.)

#### DIAGRAMME DES TRANSMISSIONS MONS ET TRIPHASÉES À GRANDE DISTANCE.

George De Ryckere. Brussels, 1923. (Gift.)

#### OVER ELECTRONENBEWEGINGEN IN TRIODEN.

Balth. Van der Pol, Jr. Eindhoven, 1923. (Gift.)

#### STANDARDS OF THE ELECTRIC POWER CLUB;

Electric Power Apparatus. October, 1923. Fifteenth Edition. Electric Power Club, Cleveland, Ohio. (Gift.)

#### WATER-POWER IN THE BRITISH EMPIRE;

Reports of the Water-Power Committee of the Conjoint Board of Scientific Societies. Sir Dugald Clerk and A. H. Gibson. (Gift.)

#### SOME POPULAR FALLACIES CONCERNING POWER DEVELOPMENT.

O. C. Merrill, 1923. (Gift.)

#### TRACTION MOTOR CONTROL; DIRECT CURRENT.

By A. T. Dover. (Pitman's Technical Primers.) Lond. and N. Y., Isaac Pitman & Sons, 1923. 114 pp., illus., diagrams, 7 x 4 in., cloth. 85 cents.

In this book Mr. Dover, who has already published a larger work on traction motors and systems of control, provides an elementary textbook on the control of direct-current traction motors, for the use of students. It is confined to an exposition of the principles involved in controlling electric cars, trains, and buses.

#### DER RADIO AMATEUR.

By P. Lertes. Dresden u. Leipzig, Theodor Steinkopff, 1924. 216 pp., illus., diagrams, tab., 9 x 6 in., paper. \$1.35.

This work is intended as a comprehensive manual for amateurs. Section 1 gives in outline the physical and electrical foundations of radio communication. Sections 2 and 3 explain in detail the sending and receiving apparatus and their operation. The fourth section gives practical advice to amateur operators, and the concluding section is a brief history of the subject. An appendix of tables and other data includes a brief bibliography.

#### A. C. PROTECTIVE SYSTEMS AND GEAR.

By J. Henderson and C. W. Marshall. (Pitman's Technical Primers.) Lond. and N. Y., Isaac Pitman & Sons, 1923. 108 pp., illus., diagrams, 7 x 4 in., cloth. 85 cents.

The devices described are those originated by British engineering firms. Devices for limiting current, for automatically disconnecting faulty apparatus, circuit-breakers, fuses, and relays are described and their application to different types of apparatus explained. Chapters dealing with maintenance and testing are included, and there is a useful brief bibliography.

#### PRINCIPLES AND PRACTICE OF TELEPHONY;

Vol. 4; Circuit Refinements and Mechanical Switching; Vol. 5; Mechanical Manual Switching. By Jay G. Mitchell. N. Y., McGraw-Hill Book Co., 1924. 2 vol., illus., 8 x 5 in., cloth. \$2.50 each.

In Vol. 4, the author discusses inter-office trunking, extra-efficient manual equipment, call distribution, two-digit mechanical switching, trunk mechanical switching, and mechanical switching traffic. In Vol. 5, he deals with combinations, including switches, with the apparatus of semi-mechanical systems, and with the mechanical features of equipment for heavy traffic. As in the other volumes, emphasis is placed on the principles and the apparatus used. The books are intended for those engaged in telephone work, who wish a knowledge of its technical principles.

#### MODERN ELECTRICAL THEORY;

Supplementary Chapter 17; Structure of the Atom. By Norman Robert Campbell. (Cambridge Physical Series.) Cambridge, England, Univ. Press,



1923. 161 pp., tab., 9 x 6 in., cloth. \$3.50. (Gift of Macmillan Co., New York.)

This supplementary chapter presents in a connected narrative the development in knowledge of the atom which has occurred since the publication of "Modern Electrical Theory". A brief introduction is devoted to the earlier work, the Rutherford-Bohr atom, atomic number and isotopes, and the classification of atomic properties. Succeeding sections discuss the nucleus, the extra-nuclear electrons, and the combination of atoms.

#### HENLEY'S 222 RADIO CIRCUIT DESIGNS.

N. Y., Norman W. Henley Pub. Co., 1923. 271 pp., illus., diagrams, tab., 8 x 5 in., paper. \$1.00.

These designs have been selected from the great variety in use, with the idea of supplying a selection of typical circuits which will work well, and of explaining these fully, so that the novice can build them with assurance of success. Diagrams are provided for each circuit.

#### ELECTRICAL INSULATION.

By W. S. Flight. (Pitman's Technical Primers.) Lond. and N. Y., Isaac Pitman & Sons, 1923. 107 pp., illus., diagrams, tab., 7 x 4 in., cloth. 85 cents.

This book is an attempt to deal with the most important characteristics of the electrical insulating materials of commerce and to show how they can best be applied in the insulation of electrical apparatus. Absorbent, non-absorbent, and liquid materials are discussed, as well as the factors that influence electric strength, the methods for testing insulation, and the insulation of high and medium voltage machinery. A bibliography is given.

#### PROCEEDINGS, 1922-23, Vol. 17, Pt. 2.

Institution of Automobile Engineers. (Exchange.)

#### DIE DREHEREI UND IHRE WERKZEUGE;

Vol. 1; Wirtschaftliche Ausnutzung der Drehbank. By Willy Hippler. Third Edition. Berlin, Julius Springer, 1923. 259 pp., illus., diagrams, tab. 9 x 6 in., boards. \$3.25.

The third edition of this work is to appear in two volumes, of which the first is now published. It is concerned with the efficient use of the lathe and the conditions for economical operation. The first section, on tool steels, discusses methods for determining correct temperatures for hardening and tempering tools, and for recognizing the various kinds of steel. This is followed by a discussion of the economic principles of cutting. Attention is directed to the relation between cutting speed, width of cut, and power consumption, and to the effects of cutting pressure, heat, cutting speed, efficiency, and power consumption on the efficiency of the tool. The economic utilization of the lathe is then considered. The final section discusses lathe design in relation to efficiency. The results of much research are summarized in the book, which should interest users and makers.

#### LIFE IN A WEST VIRGINIA COAL FIELD.

American Constitutional Association. Charleston, W. Va., 1923. (Gift.)

#### MINES OF INDO-CHINA.

Indo-China-Mines Dept. 1923. (Gift.)

#### TRANSACTIONS, Vol. 69, 1923.

American Institute of Mining and Metallurgical Engineers. (Gift.)

#### TRANSACTIONS, Vol. 31, 1921-22.

Institute of Mining and Metallurgy. (Exchange.)

#### TORFWERKE.

Friedrich Bartel. Second Edition. Berlin, 1923. (Purchase.)

#### MITTEILUNGEN UEBER DEN OSTERREICHISCHEN BERGBAU, 1923.

By Verein der Bergwerksbesitzer Osterreichs. Wien, Verlag für Fachliteratur G. m. b. H., 1923. 152 pp., 8 x 6 in., boards. 87 cents.

After ten years' interruption, the Austrian "Montan-Hanbuch" is again issued by the Austrian Mine-Owners' Association, under the editorship of the Federal Ministry for Trade and Commerce. It contains statistics on the mines of Austria, including the production of the various minerals, the mechanical equipment, consumption of materials, and employees. A directory of mines and metallurgical plants is given and also a directory of idle mines and plants, together with information on the Government mining staff.

**UNTERBAU.**

By W. Hoyer. (Handbibliothek für Bauingenieure.) Berlin, Julius Springer, 1923. 187 pp., illus., diagrams, 10 x 7 in., boards. \$1.95.

The first part of this book gives a brief account of those geological, physical, and chemical properties of the crust of the earth, which influence tunneling, earth work, and mining. This is followed by a description of the methods of excavating, with special attention to mechanical equipment. The second section treats of excavation, dams, retaining walls. The third section describes the construction of railroad underpasses and channels for streams. Section 4 treats of tunneling. The book is intended as a concise reference book for practical use by builders and designers and contains a bibliography.

**CATALOGUE OF THE COLLECTIONS IN THE SCIENCE MUSEUM.**

Bond Transport, 3; Railway Locomotives and Rolling Stock. South Kensington Science Museum. 1923. (Gift.)

**MANUAL OF STANDARDS; 1920, WITH REVISIONS TO DATE.**

American Railway Association, Mechanical Division. (Purchase.)

**BERECHNUNG UND KONSTRUKTION VON DAMPLOKOMOTIVEN.**

Bauer-Stürzer. Second Edition. Revised by W. Bauer. Berlin, 1923. (Purchase.)

**SUMMARY ANNUAL REPORT, 1923.**

New York State-Transit Commission. (Gift.)

**PROPOSED FINANCIAL PLAN FOR A RAPID TRANSIT SYSTEM FOR DETROIT.**

Detroit, Mich.-Rapid Transit Commission. 1923. (Gift.)

**HANDBUCH DES DAMPFLOKOMOTIVBAUES.**

Martin Igel. Berlin, 1923. (Gift.)

**ELEMENTS OF RAILROAD ENGINEERING.**

By William G. Raymond. Fourth Edition. N. Y., John Wiley & Sons; Lond., Chapman & Hall, 1923. 453 pp., illus., diagrams, maps, tab., 9 x 6 in., cloth. \$4.00.

The author views the railroad as an organization for the manufacture and sale of transportation, in which the arrangement of the plant is as much an item of design as the individual machines and processes. The subject of the book is the fixed part of a railroad plant and the principles that underlie its design. The author treats of permanent way, the locomotive and its work, railroad location and construction, and betterment surveys. Subjects which are fully covered in special volumes have been treated briefly and generally, while those treated only in books similar to the present one are treated in detail. In the present edition, various revisions have been made, and the chapter on Rails has been practically re-written.

**RAILWAY-SIGNALLING: MECHANICAL.**

By F. R. Wilson. (Pitman's Technical Primers.) Lond. and N. Y., Isaac Pitman & Sons, 1923. 109 pp., illus., diagrams, 7 x 4 in., cloth. 85 cents.

This introduction covers clearly the practice of signalling on British railroads. The layout of signal systems, interlocking, the connection of cross-overs, and the mechanical apparatus are described, and instructions for preparing plans are given.

**SHORT CUT TO BETTER METROPOLITAN TRANSIT.**

Gerhard M. Dahl. N. Y., 1923. (Gift.)

**MAINTENANCE AND OPERATION OF THE PANAMA CANAL.**

Jay Johnson Morrow, 1923. (Gift.)

**RELAZIONE SOPRA UNA STAZIONE IDROMETRICA SPERIMENTALE**

Per l'Esecuzione di Ricerche sul Tempo di Corrivazione e Sugli Indici di Scabrezza Relativi ai Canali di Bonifica. Gino Veronese. Venezia, 1923. (Gift.)

**VERSLAG OVER HET HAVENTOEZICHT UITGEOEFEND IN 1922.**

Published by Arrangement with the Department of Labor and Commerce, Netherland. s-Gravenhage, 1923. (Gift.)

**WATERWAYS; A PART OF THE PITTSBURGH PLAN:**

Report No. 61. Citizens' Committee on City Plan of Pittsburgh, 1923. (Gift.)

**MEMORIA DEL DIRECTORIO, 1922.**

Argentine Republic-Obras Sanitarias de la Nación, 1923. (Gift.)

**MUNICIPAL WATER SUPPLY SYSTEM OF THE CITY OF NEW YORK, APRIL, 1923.**

New York City-Dept. of Water Supply, Gas, and Electricity. (Gift.)

**WATER COMMISSION ACT GOVERNING APPROPRIATION OF WATER**

In California, 1923. California-Department of Public Works. (Gift.)

**ELEMENTARY AERONAUTICAL SCIENCE.**

By Ivor B. Hart and W. Laidler. Oxford, England, Clarendon Press, 1923. 288 pp., illus., diagrams, tab., 8 x 5 in., cloth. \$2.75. (Gift of Oxford University Press, American Branch.)

The aim of this book is to supply an elementary scientific survey of the subject, which will require no mathematical knowledge, except elementary algebra and trigonometry. It therefore occupies a position between the popular books for general readers and the serious treatises for students with considerable mathematical knowledge. The text is based on the instruction given to aircraft apprentices of the Royal Air Force, Great Britain.

**ARSENIC, CALCIUM ARSENATE AND THE BOLL WEEVIL;**

Articles and Addresses. Howard W. Ambruster. (Gift.)

**LOBLOLLY PINE IN MARYLAND.**

Joshua A. Cope. (Univ. of Maryland, State Dept. of Forestry.) (Gift.)

**FILING SYSTEM FOR ARCHITECTS' OFFICES.**

Revised 1923. American Institute of Architects. Washington, D. C. (Gift.)

**SCIENCE IN MANAGEMENT FOR THE ONE BEST WAY TO DO WORK.**

Frank B. and L. M. Gilbreth. Milan, 1923. (Gift.)

**SCIENTIFIC MANAGEMENT IN OTHER COUNTRIES THAN THE UNITED STATES;**

A Paper Delivered before the Taylor Society, January 26, 1924. (Gift.)

**UTILIZATION OF LOW GRADE AND WASTE FUELS.**

By W. Francis Goodrich. Lond., Ernest Benn, 1924. 368 pp., illus., diagrams, tab., 10 x 7 in., cloth. 42s.

The author considers the possibilities of lignite, brown coal, peat, coke breeze, town refuse, wood waste, and other waste material. He describes the methods of preparation, the necessary boiler and furnace equipment, and machinery for briquetting, and gives some information on the results obtained in practice.

**PULVERISED AND COLLOIDAL FUEL.**

By J. T. Dunn. Lond., Ernest Benn, 1924. 197 pp., illus., 10 x 7 in., cloth. 25s.

A review of accomplishment in the use of powdered coal, this book is intended primarily to call its possibilities to the attention of British manufacturers. The author describes the preparation of powdered coal, methods of transporting and firing, ash disposal, costs, advantages, and disadvantages. Typical applications for various purposes are described and a brief account of the manufacture and properties of colloidal fuel is included.

**PROCEEDINGS, 1922-23.**

Staffordshire Iron and Steel Institute. 1923. (Exchange.)

**YEAR BOOK, 1923.**

American Iron and Steel Institute. (Exchange.)

**PROCEEDINGS, 1922.**

Association of Iron and Steel Electrical Engineers. [1923.] (Exchange.)

**RESEARCH INFORMATION SURVEYS ON CORROSION OF METALS;**

Nos. 1-3; Nickel, Aluminum, Copper. By National Research Council. (Research Information Service.) Washington, D. C., National Research Council, 1923. 3 v. in 1, 11 x 8 in., paper. \$2.00.

These three bulletins review the knowledge of resistance of nickel, aluminum, and copper to various chemicals. The information is definite and the authorities for the data are given in the extensive bibliographies which accompany each monograph. The work will be valuable to every one interested in the use of these metals.

**MANUFACTURE OF ELECTRIC STEEL.**

By Frank T. Sisco. N. Y., McGraw-Hill Book Co., 1924. 304 pp., illus., diagrams, tab., 9 x 6 in., cloth. \$3.00.

A connected account of the manufacture of steel in the electric furnace, this book is intended for students and also for those engaged in practice. The book describes both apparatus and methods, including the various types of furnaces, the materials, and the various processes in use, both acid and basic.

**METALLURGY OF STEEL;**

Vol. 1; Metallurgy. By F. W. Harbord and J. W. Hall. Seventh Edition. Lond., Charles Griffin & Co.; Phila., J. B. Lippincott Co., 1923. 545 pp., illus., pl., diagrams, 9 x 6 in., cloth. 32s.

After being out of print for three years, this important work appears in a new edition which exhibits considerable changes. The text has been thoroughly revised throughout and much new matter has been introduced, which deals with recent developments in practice. New illustrations have been substituted in many cases. Particular attention is called to the new matter on reversing valves, on the production of steel in the electric furnace, on special and high-speed steels, and on heat treatment.

**REFRACTORIES FOR ELECTRIC FURNACES.**

Second Edition. N. Y., American Electrochemical Society, 1924. 96 pp., 9 x 6 in., paper. \$1.00.

This is a collection of papers by various experts, describing the necessary qualities of refractories for electric furnaces and the properties of the refractories available for this use. Most of these papers have been presented before the Electric Furnace Association.

**USEFUL INFORMATION AND TABLES COVERING OXY-ACETYLENE PIPE WELDING**

And Pipe Data. Second Edition. N. Y., Linde Air Products Co., 1923. 53 pp., illus., tab., 7 x 5 in., paper. (Price not given.)

This volume is a compilation of practical data on the cost of welding and cutting standard and heavy pipe with the oxy-acetylene torch, on the cost of laying pipe, and the total cost of pipe lines. Dimension tables for patterns for cutting pipe are given.

**LOGGING.**

By Ralph Clement Bryant. Second Edition. N. Y., John Wiley & Sons, 1923. 556 pp., illus., diagrams, 9 x 6 in., cloth. \$4.50.

Prepared primarily as a textbook for forest schools, this book is broad in scope and covers only the more important features of operation without attempting to describe local variations. It covers the methods and equipment for the movement of timber from the stump to the manufacturing plant, both by land and by water. Special attention is given to logging railroads. The new edition has been revised and re-arranged, and a chapter added on the use of crawler tractors. The bibliography has been enlarged. The book should be useful to those in the industry, as well as to students.

**DIRECTORY OF THE LUMBERMEN OF THE PACIFIC COAST, 1923.**

Timberman. (Gift.)

**MANUFACTURE OF PULP AND PAPER; Vol. 4.**

By E. C. Tucker and Others. N. Y., McGraw-Hill Book Co., 1924. 223 pp., illus., diagrams, 9 x 6 in., cloth. \$5.00.

This volume describes the preparation of rag and other fibers, the treatment of waste papers, beating and refining, loading and sizing, coloring, and paper-making machinery. As in the preceding volumes, the text is the work of a number of specialists, is written in clear, simple language, and is fully illustrated by diagrams.

**REPORT OF CONFERENCE ON APPRENTICE EDUCATION**

In the Building Trades, Held at Washington, D. C., November 15, 1923. Issued by Federal Board for Vocational Education. (Gift.)



## MANUAL OF INFORMATION ON CITY PLANNING AND ZONING.

Theodora Kimball, Cambridge, Mass., 1923. (Purchase.)

**TRANSACTIONS, Vol. 12-16, 1921-1923.**

**Society of Motion Picture Engineers. (Purchase.)**

## INDUSTRIAL SWEDEN:

Edited for Publication on the Occasion of the Gothenburg Tercentenary Exhibition in 1923. General Export Association of Sweden. (Gift.)

**JOHN H. PATTERSON, PIONEER IN INDUSTRIAL WELFARE.**

By Samuel Crowther. Garden City, N. Y., Doubleday, Page & Co., 1923.  
364 pp., illus., port., 9 x 6 in., cloth. \$5.00.

This interesting life of the founder of the National Cash Register Company describes Mr. Patterson's early training, the circumstances which led to his interest in cash registers, and the growth of the industry under his leadership. Attention is given to his activities in improving the community and in factory welfare work, to his skill in salesmanship and his methods of management.

## Current Civil Engineering Literature

### Key to Abbreviated References to Publications Indexed\*

Abbreviated References.	Publication.	Place.
Am. C. Inst.....	American Concrete Institute, Proceedings (Y.)	Detroit
A. I. E. E.....	American Institute of Electrical Engineers, Journal (M.)	New York
A. R. E. A.....	American Railway Engineering Association, Proceedings (Y.)	Chicago
A. S. T. M.....	American Society for Testing Materials, Proceedings (Y.)	Philadelphia
Am. Soc. C. E.....	American Society of Civil Engineers, Proceedings (M.)	New York
Am. Soc. Mun. Impvts.....	American Society for Municipal Improvements, Proceedings (Y.)	New York
Am. W. W. Assoc.....	American Waterworks Association, Journal (Bi-M.)	Baltimore
Am. Wood Pres. Assoc.....	American Wood Preservers Association, Proceedings (Y.)	Chicago
Ann. P. et C.....	Annales des Ponts et Chaussées (Bi-M.)	Paris
Ann. T. P. Belg.....	Annales des Travaux Publics de Belgique (Bi-M.)	Brussels
Assoc. Ing. Gand.....	Annales de l'Association des Ingénieurs sortis des Ecoles Spéciales de Gand (Q.)	Ghent
Bost. Soc. C. E.....	Boston Society of Civil Engineers, Journal (M.)	Boston
Can. Engr.....	Canadian Engineer (W.)	Toronto
Cem. Eng.....	Cement and Engineering News (M.)	Chicago
Cornell C. E.....	Cornell Civil Engineer (M.)	Ithaca
Dock & Harbour.....	Dock and Harbour Authority (M.)	London
Eng.....	Engineering (W.)	London
Eng. & Contr.....	Engineering and Contracting (W.)	Chicago
Eng. Inst. Can.....	Engineering Institute of Canada, Journal (M.)	Montreal
Eng. N. R.....	Engineering News-Record (W.)	New York
Engrs. Soc. Pa.....	Engineers' Society of Pennsylvania, Journal (M.)	Harrisburg
Engrs. Soc. W. Pa.....	Engineers' Society of Western Pennsylvania, Journal (M.)	Pittsburgh
Engr.....	Engineer (W.)	London
Engrs. & Eng.....	Engineers and Engineering, Engineers' Club of Philadelphia (M.)	Philadelphia
Gen. Civ.....	Le Génie Civil (W.)	Paris
Gesund. Ing.....	Gesundheits Ingenieur (W.)	Munich
Inst. C. E.....	Institution of Civil Engineers Minutes of Proceedings (Q.)	London
Inst. Mun. & Co. Engrs.....	Institution of Municipal and County Engineers, Journal (W.)	London
Int. Ry. Cong. Assoc.....	International Railway Congress Association, Bulletin (M.)	Brussels
Land. Arch.....	Landscape Architecture (M.)	Harrisburg
Mech. Eng.....	Mechanical Engineering (M.) Journal of the American Society of Mechanical Engineers	New York
Mil. Engr.....	Military Engineer (M.)	Washington
Min. & Metal.....	Mining and Metallurgy (M.) American Institute of Mining Engineers	New York
Mun. & Co. Eng.....	Municipal and County Engineering (M.)	Indianapolis
N. E. W. W. Assoc.....	New England Water Works Association, Journal (M.)	Boston
N. Y. R. R. Club.....	New York Railroad Club, Proceedings (M.)	Brooklyn
Oest. Ing. Arch. Ver.....	Oesterreichischer Ingenieur und Architekten Verein, Zeitschrift (F.)	Vienna
Power.....	Power (W.)	New York
Rev. Gen.....	Revue Générale des Chemins de Fer (M.)	Paris
Ry. Age.....	Railway Age (W.)	New York
Ry. Eng. & Main.....	Railway Engineering and Maintenance (M.)	Chicago
Ry. Rev.....	Railway Review (W.)	Chicago
Schw. Bauz.....	Schweizerische Bauzeitung (W.)	Zurich
Sci. Am.....	Scientific American (M.)	New York
Soc. Ing. Civ. Fr.....	Société des Ingénieurs Civils de France, Mémoires et Comptes Rendus (Q.)	Paris
Ver. deu. Ing.....	Verein deutscher Ingenieure, Zeitschrift (W.)	Berlin
West. Ry. Club.....	Western Railway Club, Proceedings (M.)	Chicago
West. Soc. Engrs.....	Western Society of Engineers, Journal (M.)	Chicago
Zeit. Bau.....	Zeitschrift für Bauwesen (Q.)	Berlin
Z. d. Bauver.....	Zentralblatt der Bauverwaltung (W.)	Berlin

\* Y = Yearly; Q = Quarterly; M = Monthly; F = Fortnightly; W = Weekly.

**A. Applied Sciences.****a. Processes of Calculation****3. Stresses and Strains**

Die Berechnung der Knickfestigkeit eines beliebigen Einzelfeldes des mehrfach gestützten Stabes.\* (Calculation of the Crushing Strength of Any Single Panel of Members with Several Supports.) H. Zimmermann. Z. d. Bauver. Nov. 21, '23.

Shortcuts for Solving Problems in Concrete Design.\* R. P. V. Marquardsen. Eng. & Contr. Dec. 26, '23.

**B. Applied Mechanics****a. Mechanics of Solids****1. Processes of Measurement**

The Study of Stress-Strain Problems by Means of Röntgen Rays.\* Eng. Serial beginning Dec. 14, '23.

**2. Elastic Solids**

Zur Berechnung von räumlichen Fachwerkträgern.\* (The Calculation of Panel Girders.) L. Geusen. Z. d. Bauver. Nov. 7, '23.

**3. Jointed Systems**

Zur Berechnung von räumlichen Fachwerkträgern.\* (The Calculation of Panel Girders.) L. Geusen. Z. d. Bauver. Nov. 7, '23.

Ueber den Einfluss der Temperaturänderungen auf den Durchmesser eines Druckstollens.\* (On the Influence of Changes of Temperature on the Diameter of a Pressure Tunnel.) W. Sattler. Schw. Bauz. Dec. 8, '23.

**b. Hydraulics****1. Processes of Measurement**

Velocity of Flow in Pipes.\* Eric Crewdson. Engr. Dec. 14, '23.

The Salt Velocity Method of Water Measurement.\* Charles M. Allen and Edwin A. Taylor. Mech. Eng. Jan., '24.

**2. Physical Hydraulics**

Einfluss der Wandbeschaffenheit eines Gerinnes auf die Wassergeschwindigkeit.\* (Influence of the Condition of the Wall of a Channel on the Speed of the Water.) R. Winkel. Z. d. Bauver. Dec. 12, '23.

**3. Industrial Hydraulics**

Turbines at Raanaasfoss Power Station.\* Hallgrim Thoresen. Can. Engr. Serial beginning Dec. 18, '23.

The Fundamental Problems of Hydro-electric Development. John R. Freeman. Mech. Eng. Jan., '24.

Hydro-Electric Development with Special Reference to the Hydraulic Equipment.\* William Monroe White. Bost. Soc. C. E. Jan., '24.

Hydro's Plan for St. Lawrence. Can. Engr. Jan. 15, '24.

To Build Three High-Head Power Plants in Norway.\* Edward Svanoe. Eng. N. R. Jan. 17, '24.

Hydro-Electric Power Developments at Shawinigan Falls, Quebec.\* Power Jan. 22, '24.

Davis Bridge Power Project to Develop 60 000 Hp.\* A. C. Eaton. Eng. N. R. Jan. 24, '24.

Neubau der Kraftanlage der Stadtmühlenwerke in Forst in der Lausitz.\* (Reconstruction of the Power Plant of the Municipal Mill at Forst in the Lausitz.) Kühn. Z. d. Bauver. Nov. 7, '23.

Wasserkraftnutzung und Helmschutz.\* (Utilization of Water Power and Home Protection.) Th. Behme. Z. d. Bauver. Nov. 21, '23.

Wärmespeicher in Verbindung mit Wasserkraftanlagen.\* (Heat Accumulator in Combination with Water-Power Plants.) F. Besser. Z. d. Bauver. Dec. 5, '23.

Hydrodynamische Versuche und Studien im Maschinenlaboratorium der E. T. H.\* (Hydrodynamic Research and Studies in the Mechanical Laboratory of the E. T. H.) F. Prasil. Schw. Bauz. Dec. 22, '23.

**c. Pneumatics**

Die Verbindung elektrischer Anlagen mit Windmotoren.\* (The Combination of Electric Plants with Wind Motors.) A. Werren. Ver. deu. Ing. Dec. 8, '23.

**C. Materials of Construction and General Processes****a. Lime, Cement, Mortar, Concrete, Brick, Bitumen, etc.**

The Disintegration of Cement in Sea Water. Discussion: John Stephen Sewell, J. A. Kitts, and William G. Atwood. Am. Soc. C. E. Jan., '24.

**c. Preservation and Use of Materials. Painting, Waterproofing**

The Removal of Rust by Electrolytic Processes.\* J. P. McLare. Eng. Jan. 4, '24.

**e. Earthwork, Cubage, Excavating Machinery**

250-Ton Dragline Excavator.\* Eng. Serial beginning Dec. 21, '23.

**f. Rock Excavation, Mining, Rock Removal**

Abstracts of Institute Papers to be read before February Meeting. Min. & Metal. Jan., '24.

## g. Execution of Works. Specifications

## 2. of Concrete.

Concrete Masonry House Construction.\* Cem. & Eng. Jan., '24.

## h. Foundations

Progress Report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations, Etc.\* Discussion: Jacob Feld and Herbert Chatley. Am. Soc. C. E. Jan., '24.

## j. Piles and Pile-Driving

Le Bardage des Pieux en Béton Armé.\* (Loading of Reinforced Concrete Piles.) Conte. Gén. Civ. Dec. 8, '23.

## 1. Construction Machinery and Tools.—Drainage

Modern Stone Crushing Plant at Dundas.\* Can. Engr. Jan. 15, '24.

Handling Concrete Materials in the Swiss Alps.\* S. A. Nuter. Eng. N. R. Jan. 17, '24.

## D. Highways

## c. Construction

Estate Road and Private Street Construction and Standardization.\* Edward Willis. Inst. Mun. & Co. Engrs. Dec. 13, '23.

Use of Asphaltic Concrete in Pavements. C. P. Johnson. (Paper presented before the Asphalt Assoc.) Can. Engr. Dec. 25, '23.

Road and Street Subsoils in Respect to Pavement Foundations and Wearing Surface Layers. J. W. Howard. Mun. & Co. Eng. Jan., '24.

Surfacing Fall Creek Boulevard, Indianapolis, with Kentucky Rock Asphalt.\* Mun. & Co. Eng. Jan., '24.

Suggested Improvements in Construction Procedure to Reduce Road Maintenance Costs. H. S. Perry. Mun. & Co. Eng. Jan., '24.

The Double Decker, South Water Street Improvement in Chicago. Mun. & Co. Eng. Jan., '24.

Designing Brick Pavement to Fit Local Conditions at Mt. Olive, Ill.\* Willis D. P. Warren. Mun. & Co. Eng. Jan., '24.

Planning the Eventual Road.\* Hugh J. Fixmer. Mun. & Co. Eng. Jan., '24.

Review of the Quarter Century Development of Warren Roadway Construction.\* George C. Warren. Mun. & Co. Eng. Jan., '24.

Changes in Road Construction and Maintenance. Harold Collins. Inst. Mun. & Co. Eng. Jan. 1, '24.

Road Foundations and Carpeting: A Review.\* Ernest Worrall. Inst. Mun. & Co. Eng. Jan. 1, '24.

Concrete Pavement Reinforcement Logically Designed.\* George D. Burr, Clifford Older and A. T. Goldbeck. Eng. N. R. Jan. 10, '24.

New York Adopts Vialog Test for Smoothness Control.\* Eng. N. R. Jan. 10, '24.

Building 1 000 Miles of Paved Road in One Season.\* C. M. Hathaway. Eng. N. R. Jan. 10, '24.

Asphalt Macadam Construction with Trailers and Tractor.\* W. C. Patrick. Eng. N. R. Jan. 21, '24.

Swamp Road Building Among the Indiana Sand Dunes.\* H. M. Herald. Eng. N. R. Jan. 21, '24.

## d. Maintenance

The Latest Types and Use of Mechanical Appliances in Connection with Road Maintenance and Construction. Norman Scorgie. Inst. Mun. & Co. Engrs. Dec. 18, '23.

Maintenance of Gravel Roads.\* Can. Engr. Dec. 25, '23.

Tar Surface Treatments Preserve Gravel Roads.\* J. T. Donaghey. Eng. N. R. Jan. 10, '24.

## e. Street Cleaning, Dust Prevention, Snow Removal

Methods and Cost of Snow Removal. Frank F. Rogers. (Paper read before Annual Conference on Highway Eng., Cornell University.) Mun. & Co. Eng. Jan., '24.

## g. Machinery and Tools

Use of Local Gravel Pits in Wisconsin During 1923.\* H. J. Kuelling. Mun. & Co. Eng. Jan., '24.

## h. Vehicles. Automobiles. Traffic

Elements of the City Traffic Problem Reviewed. J. Rowland Bibbins. Eng. N. R. Jan. 3, '24.

Theory and Calculation of Highway Transportation Cost.\* T. R. Agg. Eng. N. R. Jan. 10, '24.

## x. Miscellaneous

Saskatchewan Highway System. Hon. J. G. Gardiner. Can. Engr. Dec. 18, '23.

Business and Engineering of Road Construction. (Papers read before Am. Road Builders Assoc.) Eng. N. R. Jan. 17, '24.

Road Management, Materials and Construction. (From papers read before Am. Road Builders Assoc.) Eng. N. R. Jan. 24, '24.

## E. Bridges, Viaducts, and Arches

## a. Timber Bridges and Viaducts.

Deck on Lucin Cutoff Trestle Renewed Under Traffic.\* Eng. N. R. Jan. 10, '24.



**b. Iron or Steel Bridges and Viaducts**

- Delaware River Bridge Progress.\* Engrs. & Eng. Nov., '23.  
 Tentative Specifications for Steel Highway Bridge Superstructure.\* Discussion: L. M. Sanford, O. H. Ammann, S. Timoshenko, G. B. Woodruff, D. B. Steinman, A. W. Carpenter and Henry B. Seaman. Am. Soc. C. E. Jan., '24.  
 Through-Truss Spans Converted to Deck Girder Viaduct.\* Engr. N. R. Jan. 24, '24.  
 Ueber die ästhetische Gestaltung eiserner Brücken. (On the Esthetic Form of Iron Bridges.) Friedrich Herbst. Z. d. Bauver. Sept. 19, '23.  
 Die Beseitigung der Resonanzgefahr.\* (The Removal of the Danger of Resiliency.) Heinrich Holzer. Schw. Bauz. Serial beginning Dec. 15, '23.

**d. Concrete and Reinforced Concrete Bridges and Viaducts**

- Design of La Balme Concrete Arch Bridge.\* Jaromir Polivka. Cornell C. E. Jan., '24.

**F. Inland Waters****a. Natural Waterways (General Articles)**

- The River and Harbor Problems of the Lower Mississippi. A Symposium. Discussion: F. E. Matthes. Am. Soc. C. E. Jan., '24.  
 Chicago's Diversion of Water from the Great Lakes. Eng. N. R. Jan. 3, '24.

**b. Canals (General Articles)**

- Die neuen Ostseeschleusen des Kaiser-Wilhelm-Kanals.\* (The New Baltic Lock of the Kaiser Wilhelm Canal.) Rogge and others. Zeit. Bau. Serial beginning Pt. 7, '23.

**d. Diverting Dams. Locks. Lifts. Elevators. Inclined Planes**

- The Suorva Lakes Dams, Lapland.\* Eng. Dec. 14, '23.

**f. Supply, Sources of Water, Drains and Reservoirs**

- The Suorva Lakes Dams, Lapland.\* Eng. Dec. 14, '23.

**g. Consolidation of Banks, Leakage, Maintenance of Channel, Dredging**

- Current Retards on American Rivers.\* Engr. Dec. 28, '23.  
 Geschlebebewegung in Flüssen.\* (Movement of Detritus in Rivers.) Ph. Forchheimer. Zeit. Bau. Pt. 7, '23.

**i. Traction, Haulage, Towing, Mechanical Tractors**

- Wilmington Completes One Unit of Port Development.\* Charles H. Gant. Eng. N. R. Jan. 24, '24.

**G. Maritime Works****b. Management and Protection of the Ocean**

- Beach Erosion: Its Causes and Cure.\* Henry Clay Ripley. Am. Soc. C. E. Jan., '24.

**c. Vessels and Maritime Navigation. Lighthouses and Buoys. Various Signals**

- The Motor Ship *Margretian* with Beardmore-Speedwell Oil Engine.\* Eng. Dec. 28, '23.  
 High Speed Forms and the Curvature of Buttocks.\* P. G. Rouse. Eng. Jan. 4, '24.  
 Le Bateau à Moteurs Diesel et la Propulsion Electrique "La Playa".\* (The Vessel with Diesel Engines and "La Playa" Electric Propulsion.) Gén. Civ. Dec. 15, '23.

**e. Navigation Locks**

- The Panama Canal Lock Chain Fenders.\* R. Z. Kirkpatrick. Mil. Engr. Jan.-Feb., '24.  
 Ueber Schlebetore für Seeschleusen und Trockendocks. (On Sliding Gates for Sea Locks and Drydocks.) Groth. Zeit. Bau. Pt. 7, '23.

**g. Dredges and Dredging. Force Pumps. Refloating and Removing Wrecks. Ice-Breakers**

- The Improvement of New York Harbor.\* Henry N. Babcock. Mil. Engr. Jan.-Feb., '24.

**h. Wharves. Mooring Buoys. Harbor Equipment**

- The Reinstatement of the Dock Entrance Gates at Seaham Harbour.\* John W. Goldson. Dock & Harbour, Serial beginning Jan., '24.  
 Massregeln gegen die Ölbesudlung der Hafen- und Kanalgewässer.\* (Regulations Against Contamination of Harbor and Canal Waters with Oil.) Bruno Müller. Gesund. Ing. Nov. 24, '23.  
 Kranbahnfundamente im Hafen Grimberg der Gelsenkirchener Berg-werks-Aktiengesellschaft.\* (Craneway Foundation in the Grimberg Harbor of the Gelsenkirchen Mining Company.) A. Konrad. Z. d. Bauver. Dec. 5, '23.

**i. Harbors (General Articles)**

- An Eastern Port of Call: The Harbour of Macassar.\* D. B. Talma. Dock & Harbour Jan., '24.  
 Boulogne: Continental Gateway and Seaport.\* Dock & Harbour Jan., '23.  
 The Extension of the Port of Calcutta.\* Eng. Jan. 11, '24.

**I. Dockyard Machinery and Shipyards**

The Development of the Single Bucket Excavator.\* W. Barnes. Dock & Harbour Jan., '24.

**H. Railroads. Street and Interurban Railways. Automobiles. Aeronautics****a. Railroads****1. General Articles**

The Railways' Part in the Development of Hampton Roads. Discussion: W. D. Faucette. Am. Soc. C. E. Jan., '24.

Improvement Is Present Keynote of American Railroads.\* E. E. R. Tratman. Eng. N. R. Jan. 8, '24.

Building the Hudson River Connecting Railroad.\* Eng. N. R. Jan. 17, '24.

Die Sahara-Eisenbahn.\* (The Sahara Railroad.) F. Baltzer. Z. d. Bauver. Dec. 5, '23.

Ligne de Limoges à St. Germain-des-Fossés.\* (The Line from Limoges to St. Germain-des-Fossés.) M. Soustelle. Rev. Gen. Dec., '23.

**3. Roadbed (Construction Work)**

Santa Fe Builds 49 Mile Cut-Off in Kansas.\* Ry. Age Dec. 29, '23.

**4. Track**

Low Carbon Rails Show Less Transverse Fissures.\* C. W. Gennet, Jr. Ry. Age Jan. 12, '24.

Cross Tie Conditions on the Pacific Coast. Mason E. Kline. (Paper read before the National Assoc. of R. R. Tie Producers.) Ry. Rev. Jan. 19, '24.

Wood Preservers Show Economy of Treatment.\* Ry. Age Jan. 19, '24.

**5. Signals and Safety Apparatus**

Progress on Automatic Train Control. Ry. Rev. Jan. 5, '24.

Drastic Extension of Automatic Train Control Order. Ry. Rev. Jan. 19, '24.

**6. Rolling Stock (Locomotives, Cars)**

Four-Cylinder 4-6-0-Type Locomotive; Great Western Railway.\* Eng. Dec. 14, '23.

The Vermont Shunting Locomotive.\* Eng. Dec. 21, '23; Eng. Dec. 28, '23.

The Mass Production of Railway Wagons.\* Eng. Dec. 28, '23.

Mikado Type Locomotive, Canadian National Rys.\* Ry. Rev. Jan. 5, '24.

Some Notable Locomotives of Recent Design.\* James Partington. (Abstract of Paper presented before the Canadian Railway Club.) Ry. Age Jan. 12, '24.

New Sleeping Cars on the Canadian National.\* Ry. Age Jan. 12, '24.

Automotrices Monophasées des Chemins de Fer Fédéraux Suisses.\* (Single Phase Motor Cars of the Swiss Federal Railroad.) Rev. Gen. Dec., '23.

Untersuchung über Lagermetalle für den Eisenbahnbetrieb.\* (Investigation of Bearing Metals for Railroad Use.) J. Karafiat. Oest. Ing. Arch. Ver. Aug. 31, '23.

Die Lösung der Eisenbahnlagerfrage durch das S K F sphärische Rollenlager.\* (Solution of the Railroad Bearing Problem by the S K F Spherical Roller Bearing.) Franz Nussbaum. Oest. Ing. Arch. Ver. Aug. 31, '23.

Die Dampfturbine als Lokomotivantrieb.\* (The Steam Turbine as Locomotive Power.) U. R. Ruegger. Schw. Bauz. Dec. 8, '23.

**7. Use of Electricity**

Le Programme D'Electrification Partielle du Réseau des Chemins de Fer P.-L.-M.\* (Program for the Partial Electrification of the P.-L.-M. Railroad System.) Gén. Civ. Dec. 15, '23.

**8. Stations. Engine Houses. Shops**

Engineering of Refrigeration and Development of Car Icing Stations. J. W. Inghram. West. Soc. Engrs. Jan., '24.

Railroad Transportation and Railroad Terminals. A Symposium. Discussion: J. G. Roney. Am. Soc. C. E. Jan., '24.

Repair Shops at Bathurst St., Toronto.\* Can. Engr. Jan. 1, '24.

Burlington's New Shops Greatly Increase Facilities.\* Ry. Rev. Jan. 5, '24.

Equipment Trust Plan for Locomotive Terminals. Ry. Age Jan. 12, '24.

Erie Completes Modern Addition to Hornell Shop.\* Ry. Age Jan. 12, '24.

Systematic Car Repair Work at Kent, Ohio.\* G. W. Armstrong. Ry. Rev. Jan. 19, '24.

Das neue Empfangsgebäude des Bahnhofes Lindau am Bodensee.\* (The New Buildings of the Lindau Railroad Station on the Lake of Constance.) W. Hellmann. Zeit. Bau. Pt. 7, '23.

**9. Technical and Commercial Use**

Transportation of Perishable Freight. G. H. Nelson. West. Soc. Engrs. Jan., '24.

**b. Special Railroads****3. Narrow Gauge Light Railways**

Light Railway Construction and Use.\* D. W. Dodge. Mil. Engr. Jan.-Feb., '24.

**d. Street Railways, Elevated Railways, Subways****1. General Articles**

Progress of Construction of the Interborough Rapid Transit Company's Jerome Avenue Permanent Inspection Shed.\* J. J. Delbourgo. Cornell C. E. Dec., '23.

London Improves and Extends Its Transit System.\* Eng. N. R. Jan. 24, '24.

Die Untergrundbahn von Madrid.\* (The Madrid Underground Railroad.) Karl Domansky.

Oest. Ing. Arch. Ver. Dec. 7, '23.

Untergrundbahnen.\* (Underground Railroads.) Wagenführ. Oest. Ing. Arch. Ver. Dec. 7, '23.

**c. Automobiles****2. Internal Combustion Engine Automobiles**

A Remarkable Motor Car.\* Engr. Dec. 21, '23.

Suspension pour Automobiles Système Sizaïre Frères.\* (Sizaïre Brothers System of Automobile Suspension.) Gén. Civ. Dec. 8, '23.

## I. Aeronautics

## 1. General Articles

Die Entwicklung der theoretischen Aeromechanik. (The Development of Theoretical Aeromechanics.) R. Knoller. Oest. Ing. Arch. Ver. Oct. 12, '23.

L'Aviation pendant et après la Guerre.\* (Aviation During and After the War.) M. Rodolphe Soreau. Soc. Ing. Clv. Fr. Juin, '23.

## 2. Dirigible Balloons

Our First Rigid Airship the "Shenandoah".\* Sci. Am. Feb., '24.

## 3. Aeroplanes

Water-Cooled Aero Engines.\* A. J. Rowledge. (Paper read before Inst. Automobile Engrs.) Eng. Jan. 11, '24.

## I. Municipal Water-Works. Agricultural Engineering

## a. General Articles

Wasserversorgung mit Flusswasser oder mit künstlich erzeugtem Grundwasser.\* (Water Supply with River Water or with Artificially Produced Ground Water.) Scheelhaase. Gesund. Ing. Dec. 1, '23.

## b. Hydrology—Water Resources

Periodic Fluctuations of Rainfall in Hawaii.\* Discussion: Frederic I. Winslow. Am. Soc. C. E. Jan., '24.

The Intensity of Rainfall.\* J. W. Meares. Eng. Jan. 11, '24.

## c. Dams and Reservoirs

Stresses in Multiple-Arch Dams.\* B. F. Jakobsen. Discussion. Am. Soc. C. E. Jan., '24.

Improved Type of Multiple-Arch Dams.\* Discussion: R. McBeanfield, Laurence J. Waller, Evan T. Fisher and H. E. Linden. Am. Soc. C. E. Jan., '24.

## d. Analysis and Purification of Water

Water Softening Demonstration. Charles P. Hoover. Am. W. W. Assoc. Jan., '24.

Water Softening by Base Exchange.\* Gerald C. Baker. Am. W. W. Assoc. Jan., '24.

The Degasification of Water. J. R. McDermet. Am. W. W. Assoc. Jan., '24.

The Purification of Colored Water at Wilmington, N. C.\* George D. Norcom. Am. W. W. Assoc. Jan., '24.

Editors for Washing the Rapid Filters at Zelenople. Leo Hudson. Eng. N. R. Jan. 17, '24.

## e. Distribution of Water

Financing Municipal Water Supply Extension.\* Caleb Mills Saville. Am. W. W. Assoc. Jan., '24.

Fire Protection Requirements in Distribution System Design.\* V. Bernard Siems and D. Benton Biser. Am. W. W. Assoc. Jan., '24.

Use of Hydrants for Purposes Other than Extinguishing Fires. John W. Toyne. Am. W. W. Assoc. Jan., '24.

The Park Ridge Pumping Station. W. T. McClenehan. Am. W. W. Assoc. Jan., '24.

The Relation of Water Works to Fire Insurance Rates. Harry J. Corcoran. Am. W. W. Assoc. Jan., '24.

## J. Sewerage. Sewage and Refuse Disposal

## a. Sewers and Drains

The Distribution of Intense Rainfall and Some other Factors in the Design of Storm-Water Drains.\* Frank A. Marston. Am. Soc. C. E. Jan., '24.

Les Tuyaux d'Egout en Ciment Arme.\* (Reinforced Concrete Sewer Pipe.) Ch. Dubosch. Ann. T. P. Belg. Dec., '23.

## b. Sewage Disposal. Purification

Conference on Pollution of Streams. Engrs. & Eng. Nov., '23.

The Powers, Duties and Policies of the Sanitary Water Board of the Commonwealth of Pennsylvania. W. L. Stevenson. Engrs. & Eng. Nov., '23.

Imhoff Tank Operating Procedure. Earle L. Waterman. (Abstract of Paper presented to Fifth Conference on Sewage Treatment at Ames, Iowa.) Eng. N. R. Jan. 10, '24.

## c. Refuse Disposal

Waste Renovating Plant at Beech Grove, Ind.\* Ry. Rev. Dec. 29, '23.

## x. Miscellaneous

Present Status of Sanitary Engineering; Suggestions for Objects and Aims of the Sanitary Engineering Division. Harrison P. Eddy. Am. Soc. C. E. Jan., '24.

November Typhoid Epidemic in Part of Chicago.\* Eng. N. R. Jan. 17, '24.

## K. Heat Engines

## a. Steam Engines. Boilers

22,000 Volt Electric Steam Boiler.\* F. H. Falter. Engrs. & Eng. Nov., '23.

**b. Steam Turbines**

- Maintaining Quality of Steam Turbine Oils in Service.\* Charles H. Bromley. Power Jan. 22, '24.  
 Steam-Turbine Development Influenced by Higher Pressures and Reheating.\* Power Jan. 1, '24.

**c. Gas and Oil Engines**

- Exhaust-Valve and Cylinder-Head Temperatures in High-Speed Petrol Engines.\* A. H. Gibson and H. Wright Baker. (Paper read before Inst. of Mech. Engrs.) Eng. Serial beginning Dec. 21, '23; Dec. 21, '23.  
 Die Nürnberger Grossölmaschine. (The Nuremberg Large Oil Engine.) W. Laudahn. Ver. deu. Ing. Dec. 8, '23.

**L. Electricity****a. Production of Electricity**

- Die Verbindung elektrischer Anlagen mit Windmotoren.\* (The Combination of Electric Plants with Wind Motors.) A. Werren. Ver. deu Ing. Dec. 8, '23.

**b. Distribution and Transmission of Electricity**

- Metropolitan Edison Company's Middletown Plant.\* Power Dec. 25, '23.  
 Modern High-Tension Power Transmission Lines.\* Walter Dreyer. Eng. N. R. Jan. 3, '24.  
 Power from Mercury Vapor.\* Sci. Am. Feb., '24.

**2. Long-Distance Transmission of Energy.**

- La Télémechanique. (Long Distance Power Transmission.) M. Maurice Percheron. Soc. Ing. Civ. Fr. June, '23.

- La Transformation de la Ligne Electrique de Big Creek à Los Angeles, pour Porter la Tension de 150 000 à 220 000 Volts. (Changing the Electric Line from Big Creek to Los Angeles, to Carry a Tension of 150 000 to 220 000 Volts.) Gen. Civ. Dec. 15, '23.

**3. Distribution and Wiring of Electricity**

- Vue d'Ensemble sur les Propriétés Fondamentales des Réseaux à Haute Tension. (General Survey of the Fundamental Properties of High-tension Network.) Paul Janet. Soc. Ing. Civ. Fr. June, '23.

- Les Lignes à très Haute Tension et les Grands Réseaux Electriques en France.\* (Very High-tension Lines and Great Electrical Networks in France.) M. Bizet. Soc. Ing. Civ. Fr. June, '23.

**6. Safety of Electric Distribution Systems. Laws and Regulations**

- The Cooperative Treatment of the Electrolysis Problem at Council Bluffs, Iowa, and Omaha, Nebraska.\* P. H. Patton. Am. W. W. Assoc. Jan., '24.

**f. Signals and Communication**

- L'Etat Actual des Applications des Ondes Hertiennes. (Present State of the Applications of Hertzian Wave.) M. le Général Ferré. Soc. Ing. Civ. Fr. June, '23.

- Les Grandes Stations de Radiophonie aux Etats-Unis.\* (The Large Radiotelephone Stations of the United States.) J. Lynn. Gen. Civ. Dec. 8, '23.

**M. Architecture****a. Educational, Government and Scientific Buildings**

- Progressive Economy in Concrete Schoolhouse Design at Philadelphia.\* (From Concrete.) Eng. & Contr. Dec. 26, '23.  
 Das Asiatische Museum in Berlin-Dahlem.\* (The Asiatic Museum in Berlin-Dahlem.) Z. d. Bauver. Dec. 12, '23.

**b. Business and Commercial Buildings**

- Moving the Seven Story Dowle Building.\* Hugo Filippi. West. Soc. Engrs. Jan., '24.

**c. Residences, Hotels**

- Das Einfamilienhaus des Staatl. Bauhauses Weimar.\* (The One-Family House of the Weimar Municipal Building Establishment.) W. Liese. Gesund. Ing. Dec. 8, '23.

**d. Storage Buildings**

- Pneumatic Grain Elevators.\* W. Cramp and A. Priestly. Engr. Jan. 11, '24.

**f. Factories and Mill Buildings**

- Roof Types and Surfaces for Industrial Buildings.\* Walter F. Ballinger. (From Architectural Forum.) Eng. & Contr. Dec. 26, '23.  
 Structural Teachings of the Oppau Explosion.\* Dr. E. G. Friedrich. Eng. N. R. Jan. 10, '24.

**x. Miscellaneous**

- The Earthquake Risk in Boston. Irving B. Crosby. Bost. Soc. C. E. Dec., '23.  
 L'esthétique dans les Constructions en Béton Armé. (Esthetics in Reinforced Concrete Structures.) Léon Petit. Gen. Civ. Dec. 15, '23.  
 Baugeschichte von Kurland seit Ausgang des Mittelalters.\* (Architectural History of Kurland Since the End of the Middle Ages.) Walter v. Kurowski. Zeit. Bau. Pt. 7, '23.  
 Schwedische neue Architektur.\* (Swedish Modern Architecture.) Z. d. Bauver. Sept. 19, '23.



**O. Administration. Legislation. Economics. Statistics****b. Economic Questions of a General Character; Valuations, etc.**

Are Surety Bond Premium Rates High? R. H. Towner and H. H. Willson. Eng. N. R. Jan. 10, '24.

**d. Administrative and Financial Management of Means of Communication**

Shop Scheduling and Production Control.\* Laurence C. Bowes. Ry. Rev. Dec. 29, '23.

**5. Railroads and Street Railways**

Statistique Résultats Obtenus en 1922 sur les Réseaux des Cinq Compagnies Principales des Chemins de Fer Français.\* (Statistical Results Obtained During 1922 on the Systems of the Five Principal French Railroad Companies.) Rev. Gen. Dec., '23.

Résultats d'Exploitation des Chemins de Fer d'Alsace et de Lorraine. (Operating Results of the Railroads of Alsace and Lorraine.) Rev. Gen. Dec., '23.

**Q. Surveying and Geodesy**

Aerial Photography an Aid to Better Map Making.\* Gerald H. Matthes. Eng. N. R. Jan. 3, '24.

Surveying the Colorado Grand Canyon.\* C. H. Birdseye. Mil. Engr. Jan.-Feb., '24.

Wireless Longitude Determinations. George D. Cowie. Mil. Engr. Jan.-Feb., '24.

**S. City Planning**

Housing Problems in Relation to Industry.\* Bernard J. Newman. Engrs. & Eng. Nov., '23.

Town Planning Questionnaire. Can. Engr. Dec. 18, '23.